

DONATED WHEELCHAIRS IN LOW-INCOME COUNTRIES – ISSUES AND ALTERNATIVE METHODS FOR IMPROVING WHEELCHAIR PROVISION

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Abstract

Statistics show that an estimated 95% of people who need a wheelchair don't have one [1]. A common response is to view this lack as an emergency situation which can be remedied by the mass distribution of donated wheelchair products alone. This “*anything is better than nothing*” approach views any wheelchair as a solution ignoring the complexities of provision and the needs of the individual.

This approach is both an inappropriate method to meet the mobility and social needs of wheelchair users and has wider negative impacts for long-term mobility provision and social development initiatives. Comprehensive, responsible and sustainable wheelchair provision must address the following essential criteria:

- **Adjustability** of the wheelchair to fit the user and include a pressure relief cushion
- **Suitability** to environment and users' needs
- **Durability** and ability to be repaired locally
- **Training** in wheelchair use and health issues
- **Sustainability** to ensure wheelchairs provision is long-term and appropriate.

This paper advocates for the provision of wheelchairs that maximise disabled people's independence and their ability to participate in society. The key is to ensure that wheelchairs are provided through professional services which can assess, prescribe and fit an appropriate wheelchair with corresponding education and follow-up. Ultimately, to ensure that wheelchair services meet the essential criteria, locally appropriate solutions must be integrated into national rehabilitation services and structures.

1 Introduction

“[M]any different groups and organizations, in different parts of the world, have claimed to be working on behalf of disabled people. Generally this has been through exclusion, segregation and patronizing welfare programs (the charity model); attempts to “cure” the individual disabled person (the medical model); or most commonly, a mixture of the

two. There has been little recognition of disabled people having equal rights, or of the barriers that are faced (the social model).” [2]

Conservative estimates put the number of people with disabilities in low-income countries at close to half a billion, and an estimated twenty million require wheelchairs to be mobile [3]. Many charitable organisations and faith groups have responded to this need by exporting donations of second-hand refurbished wheelchairs to the majority world or by mass producing low-cost and low-quality designs that are inappropriate for local conditions and the needs of the people they are meant to support. Complex medical equipment is often distributed with little or no professional clinical or technical input. Some products are “one-size fits all” which reach many but serve none. These approaches bypass the crucial element of wheelchair provision: service. They mean that disabled people receive an inferior and ill-fitting product that can lead to secondary complications. Furthermore, relying on expatriate staff and sporadic donations for wheelchair provision negatively impacts on local services' capacity to serve their community in the long-term, and mean that governments do not prioritise mobility services.

This paper will examine the current paradigm for humanitarian wheelchair donations in low-income countries by using five criteria that responsible wheelchair provision should meet to ensure the needs of the disabled person are met. The five essential criteria that wheelchair provision should meet are *adjustability*, *suitability* and *durability* of the wheelchair, *training* for the wheelchair user and *sustainability* of provision.

This paper will argue that the current approach through mass exportation of inappropriate designs without professional services are in numerous ways damaging to the intended beneficiaries. Recommendations will be made for alternative methods of wheelchair provision in low-income countries. The central premise this paper expounds is that appropriate wheelchair provision is not only about the wheelchair product [4]. Instead, it is about enabling people to be mobile, healthy and participate fully in their communities. A wheelchair is the catalyst to increased independence and social integration, but it is not an end in itself [5, 6, 7].

2 Wheelchair provision in low-income countries

A. Wheelchair service models

Wheelchair service provision for disabled people in low-income countries has been routinely neglected by national governments and mainstream development agencies. There are many impediments to comprehensive, professional service provision in low-income countries, including limited rehabilitation services; severe shortages (and in some cases absence) of physical or occupational therapists; lack of political will coupled with limited capacity to run wheelchair services and finances to sustain them [8].

The gap in wheelchair service provision has been the driving force for international humanitarian aid and faith-based organisations. Since the 1990s, there has been a marked increase in the mass distribution of second-hand or low-quality wheelchairs to low-income countries. The only alternative is for disabled people to obtain a mobility device from a small scale local workshop run typically by Disabled People's Organisations and local non-governmental organisations. In both approaches, the majority of mobility equipment is provided directly to the beneficiary, bypassing the crucial service stage of the process. In contrast, wheelchair service models that exist in industrialised countries comprise a team of allied health professionals linked with commercial wheelchair manufacturers (see Table 1).

Service model	Industrialised country	Low-income country
<i>Beneficiary</i>	é Wheelchair User	é Wheelchair User
<i>Service</i>	€ Occupational Therapist € Physiotherapist € Rehabilitation Engineer € Clinical Assistant	Few integrated services or professionally trained staff
<i>Product</i>	F Commercial Wheelchair manufacturer	Local workshop or donated wheelchairs

Table 1: Comparison of industrialised and low-income countries service models [9].

However, it is difficult and inappropriate to replicate this model in non-industrial countries. These countries lack the infrastructure to develop such systems, particularly as 70% of disabled people in low-income countries are estimated to live rurally [10] in areas that are not adequately served by institutional health services. Rehabilitation services in functioning health care structures in industrialised countries distribute wheelchairs through a multi-disciplinary team of health care professionals which include a physiotherapist, a

rehabilitation engineer, occupational therapist and clinical assistants. They are trained professionals who assess, prescribe and fit the wheelchair, and deliver education and a follow-up service to maximise the user's potential for independent mobility. When the provision of wheelchairs bypasses this vital service step the effect is often negative and sometimes life-threatening for the individual.

B. The humanitarian aid approach to wheelchair provision

Given that 95% of people who need a wheelchair don't have one [11] the "anything is better than nothing" humanitarian approach has made significant inroads into supplying large numbers of wheelchairs to disabled people in low-income countries. The main organisations involved have distributed between 20, 000 - 400, 000 wheelchairs in the last 15 years. These figures are impressive but numbers do not show if these hundreds of thousands of wheelchairs are increasing mobility, improving health, independence and an individual's quality of life. "Many organisations clearly state their goals in terms of number of wheelchairs to distribute and not in terms of what people will actually accomplish with the chairs." [12].

Refurbishing donations from industrialised countries or distributing lightweight, cheaply made products that cannot be adjusted to suit the user's individual disability and lifestyle needs overrides the real focus of wheelchair provision; enabling disabled people to live with dignity in society. If a wheelchair does not contribute towards mobility and independence, then that wheelchair continues to socially and often physically disable rather than enable. Furthermore, ill-fitting and unsuitable wheelchairs can cause life-threatening secondary complications.

The medical model and the social model of disability:

The humanitarian method of wheelchair provision is founded on a the premise that disability can be seen as a medical problem that can be solved by providing medical equipment alone, and by the idea that the equipment shortage in low-income countries can be solved by donors providing wheelchairs for those who cannot afford them. This approach ignores the complexity of disability, and in particular it ignores the distinction between impairment and disability and the difference between charity and development.

The Medical model of disability, which defines mobility disability solely as a matter of impairment is a common perspective. However, the issue is not simply that millions of people are physically immobilized, but that they are prevented them from receiving an education, marrying, having families, working to support themselves or their families, or otherwise participating in their communities. The Social model advocates that disability must be seen as an ongoing part of life within local social, cultural, economic, and political contexts and not as a medical emergency to be solved. Technology is only part of the solution [13]. There is an important and fundamental difference between disability and other forms of disadvantage; disabled people can only organise to claim their wider rights and demand equality when their practical needs have been met. However, meeting these practical needs is only the first step towards disabled people's inclusion and full participation.

The charity model and the social empowerment approach:

Humanitarian agencies tackle the ‘medical emergency’ by distributing wheelchairs *ad infinitum*. Yet we need to ask if there is an end to this perceived crisis and analyse how low-income country governments can be empowered to take on responsibility for effective wheelchair service provision. Charitable donations of unsuitable chairs threaten local production and do nothing to empower users to advocate for rehabilitation services, equipment and their wider rights. The fact that most donors operate under a charity model rather than an independent living mode is an inherent problem in securing the future of sustainable wheelchair service provision in low-income countries.

Wheelchair users in low-income countries often cannot afford to pay for their own wheelchairs, so government agencies, development organisations, and charitable and religious institutions act as consumers instead of denying users the option to make their own choices. The usual market forces of consumer-based supply and demand are absent with the result that disabled people are disenfranchised from the design, production and selection processes and become passive recipients of charity rather than empowered consumers [14]. When donors focus their attention on the product instead of the end users, the distribution of wheelchairs takes precedence over the socio-economic integration of people with disabilities into their communities. The charitable or top-down approach, where donors control all facets of the provision process engenders a dependency that perpetuates the status of wheelchair recipients as victims at the bottom of the socio-economic hierarchy [15]. “Disability is a problem of socio-economic immobility as much as physical immobility” [16].

3 Inappropriate wheelchair donations

Low quality wheelchairs that cannot be adjusted and are inappropriate for the environment in which they are used are not a suitable solution to wheelchair provision in developing countries. These wheelchairs break quickly, cannot be repaired locally and can cause secondary complications that at best have a negative impact on an individual’s mobility and independence, and at worst can be life-threatening. This approach is inherently inappropriate and unsustainable.

Adjustability: A wheelchair must either be custom-made to an individual’s size, or should be easily adjustable to fit the user. When necessary, it should be able to accommodate supportive seating needs for people who require more complex postural support. Users who can self propel should have their wheels positioned in the active position to maximise independent mobility [17]. Only people who have received appropriate clinical and technical training should adjust wheelchairs to reduce the threat of potentially fatal health problems, such as pressure sores, scoliosis and contractures caused by an ill-fitting wheelchair.

Inappropriate donated wheelchairs can rarely be adjusted to fit the individual user and are frequently too small or too large, especially for children. Similarly, many low-cost mass produced designs that are being distributed are “one size fits

all”, they simply cannot be adjusted at all which has major health and mobility repercussions for wheelchair users. Many refurbished industrialised country models are designed to be adjusted; however, it is ex-patriot staff flown in with each shipment of wheelchairs that tend to perform alterations, meaning there is no local follow-up service to reassess the wheelchair fit for the user over time. Follow-up services are particularly important for growing children who need good trunk support to avoid scoliosis.

Most people who sustain a spinal cord injury in low-income countries die within two years, compared to a normal life expectancy in industrialised countries [18]. One of the leading causes of this premature death is pressure sores. It occurs when an area of skin does not receive any pressure relief, causing the tissue to die due to lack of blood flow to that area. Pressure sores can take up to a year to heal, and if left untreated the sore will become infected and cause death. Pressure sores are relatively easy to prevent with a simple pressure relief cushion, yet cushions are rarely provided with humanitarian wheelchair donations. The cost-benefit argument that more wheelchairs can be donated at the same cost if cushions are not provided does not hold up to scrutiny. A 1999 cost survey at Ragama Rehabilitation Hospital in Sri Lanka estimated the cost of care for a pressure sore patient at US \$2,483 per year. The simplest pressure relieving cushion available in Sri Lanka costs only US \$15 [19]. Pressure relief cushions are a vital part of responsible wheelchair service provision.

Suitability: The wheelchair must be designed to suit the terrain and environment in which it is used. Most imported used wheelchairs are American and European designs from the mid-20th Century, meant for home and institutional use. These designs were not intended for outdoor use especially in the conditions prevalent in low-income countries, which tend to have uneven or unpaved roads or sandy terrain [20]. A study in India [21] revealed that 60% of wheelchair users who had received a donated wheelchair stopped using them due to the discomfort of using the wheelchair and the unsuitability of the wheelchair design for the environment. For example, a standard wheelchair from industrialised countries will usually have small, narrow, lightweight castor wheels, with a low rolling resistance, effective for use inside or on paved ground. When the same castor wheels are used in low income countries, they are unsuitable, unwieldy and easily broken, and can even put the user in danger. On unpaved roads or rough ground the wheels will have poor manoeuvrability, they may easily get stuck in mud or sand and if they encounter any obstacles like rocks just half the diameter of the castors the chair could come to a sudden stop and throw the user out of the chair. By considering such issues, chairs can be designed to be appropriate to both the user and the environment, usually with very little, if any, cost implications.

A wheelchair should also be suited to the individual’s disability and lifestyle needs. There is not one type of wheelchair that is this versatile. The “one size fits all” wheelchair is a myth that disregards the complexity of disability and the importance of ensuring that a wheelchair

is a positive tool. “Wheelchair provision should be executed in a multidisciplinary manner, as dictated by the complexity of the user’s requirement, considering the level of disability, functional ability, needs and activities. Inappropriate implementation of wheelchairs results in drastic deterioration of the morale of the users” [22]. In contrast, an appropriate wheelchair can be a catalyst that empowers users to seek fulfilment of their wider rights and desires.

Durability: Most wheelchair users need to use their wheelchair for at least 15 hours a day, seven days a week. In low-income countries, many people will be using the chair on rocky, unpaved roads in a hot or humid climate which will put considerable strain on the wheelchair. Therefore, the wheelchair must be able to handle constant, long-term use in rugged conditions. If the wheels, frame and upholstery of the chair are not high enough quality, the chair will quickly break down and leave the user without any form of mobility. Donated wheelchairs, designed to be used primarily in indoor environments, will often last no more than three to six months in low-income countries. Wheelchairs must be well made, sturdy and specifically designed for use in low-income countries on rough terrain. A wheelchair must also be easily repaired. In most low-income countries, parts like bicycle wheels and bearings are readily available but usually will not be the correct size for a wheelchair donated from overseas. In many cases the only way to find spare parts is to order them from overseas which most wheelchair users in low-income countries cannot afford nor do they have access to the infrastructure to do so. As a result, once the tyre needs replacing or a front caster wheel breaks, the user will often no longer be able to use the chair.

The durability of many cheap wheelchair designs and refurbished donated wheelchairs is frequently compromised by all or any of the following:

- Component parts in industrialised country designs are not intended to be replaced when they wear out. They are designed to be thrown away because they are not economical to fix. Similarly, the bearings used in cheap mass produced products are low quality and are often not a standard size. Replacement parts are not easily available in developing countries or are very expensive to buy or import.
- Plastic parts components are often used which are not easily repairable if they are weight bearing and available glues are not strong enough.
- Most recipients in low-income countries use their wheelchair outdoors for much of the time. They also take much heavier loads than they are designed for. Many subsistence farmers across low-income countries use them to carry produce back or to sell any excess at the market which are lifestyle conditions that are common but they are not catered for with these indoor wheelchair designs.
- The paint used on the frame is poor quality so when a chair gets scratched they rust very quickly in humid or salty air.

- The upholstery stretches and isn’t replaceable, this can cause secondary complications with posture such as scoliosis.
- Chairs often come with 24 inch wheels that are often not available in low-income countries. Thus tyres and spokes difficult to replace.
- Wheels are sometimes made of plastic because they are very cheap to produce. However, these bend easily or break which is another example of reducing costs at the expense of durability.

There are no widely accepted appropriate standards to ensure quality products. Wheelchairs donated or sold in low-income countries do not meet uniform standards. Those that do are based on standards designed for industrialised countries which are not stringent enough to adequately test wheelchairs in the more rigorous conditions in developing countries [23].

Training: Using a wheelchair does not come naturally. Wheelchair users must be trained how to safely use their wheelchair at home and in their community. Charitable donations do not typically provide training for the user to ensure adequate working knowledge of the wheelchair or how to use it to its full potential. Mukerjee and Samata’s study in India [24] found that no training was given to the recipient group to promote individual wheelchair mobility like transferring, manoeuvring and operating the wheelchair components. These skills are essential to enable the user to live an independent, active life.

This lack of information on wheelchair use also extends to education on disability-specific health care. Without information about bladder, bowel and skin management strategies, secondary health complications cannot be prevented. To maximise independence and promote rather than jeopardise health, changes in bodily functions caused by the onset of the disability should be addressed, as well as provision of assistive mobility devices.

In 1997 75% of people admitted to Ragama Rehabilitation Hospital in Sri Lanka with spinal cord injuries died within 18 to 24 months from secondary complications arising from their injuries. The incidence of pressure sores decreased by 71% and repetitive urinary tract infections decreased by 61% within two years as a result of improvements in health training and appropriate equipment [25].

Sustainability: Approaches to wheelchair provision should be designed to make wheelchair services available to the community in the long term. A large influx of donated wheelchairs can put local wheelchair producers out of business, eliminating the long-term source of wheelchairs for that community. Many providers of used wheelchairs organise shipments of wheelchairs to low-income countries, stage ‘giving ceremonies’, collect publicity photos and then leave. When those wheelchairs break weeks or months later, there is nowhere for the recipient to go for repairs. Equally, when children grow too big for their wheelchairs or a chair has broken beyond repair, there is no facility to access a new one. When people have an accident or an illness and need a wheelchair, they must wait until the next charitable wheelchair distribution. It is also impossible for recipient

country health services to keep accurate records of disability prevalence and the need of wheelchairs in an area because people 'drop out' of established referral systems when they receive a donated wheelchair, only to become 'invisible' again when their chair breaks.

Long-term, effective mobility equipment provision requires support for local wheelchair service centres with well-trained, in-country staff, preferably people with disabilities who understand the needs of their communities. Lack of knowledge regarding wheelchairs as a product reduces the potential of wheelchair users as a group to actively lobby for better, more suitable products [26]. Currently, there are few training programmes that teach local staff how to properly prescribe and fit wheelchairs or how to provide adequate working knowledge of the wheelchair, health issues or peer group support for individuals. Disabled people need to be empowered to be part of the process of provision and not passive recipients of charity, in order to demand sustainable, long-term wheelchair service provision from governments and duty bearers.

The outcome of providing wheelchair product that cannot be adjusted, are not suitable for the users' needs and lifestyle, are not durable for the environment and are low-quality is that these wheelchairs break quickly, cannot be repaired and can cause secondary complications which have a negative impact on a person's mobility but may also threaten their life. These wheelchairs are not a solution – this approach is inherently inappropriate and unsustainable.

4 Appropriate mobility provision

A. International Standards on Wheelchair Provision Services

In 2004, a group of international disability organisations - Motivation, Whirlwind Wheelchair International and Center for International Rehabilitation - formed a consortium to promote the development of international standards in products, services and training for wheelchair provision in low-income countries [27].

Products: Designing wheelchair standards that are relevant to low-income country context but that fit in with ISO standards for strength, safety and durability. Standards for mobility products will protect users, purchasers and service providers by ensuring that the basic standards of strength, durability and functionality are achieved.

Services: A standardised approach to the delivery of wheelchairs in terms of comprehensive assessment, prescription, fitting and basic training for users will ensure that the needs of the individuals are professionally and adequately met.

Training: All technical, clinical and educational elements of wheelchair provision need to be implemented by trained professional staff. Comprehensive, standardised training will ensure services can draw from a solid knowledge base to ensure that the user receives a product is indeed instrumental

in maximising independent mobility and wheelchair and health training prolongs life and facilitates social integration.

B. Professional Mobility Services

There are many designs of high quality appropriate wheelchairs for use in low-income countries that utilise locally available materials and local skilled labour to produce chairs that are appropriate for local needs, use and body culture. These models are designed to be produced in local workshops which are often run by disabled people themselves. If properly initiated and supported, local workshops successfully custom build products and/or supply appropriate wheelchairs that can be adjusted to fit the user. Designs can be strength tested according to the local conditions and adaptations can be made if necessary. Similarly, wheelchairs made from locally produced materials in local, community workshops can be easily, cheaply and quickly repaired. A further benefit of this approach is that an individual can be trained in wheelchair skills and care when they receive the product, maximising their mobility and the benefit of the wheelchair.

However, irregular demand means that local workshops and services often have low-productivity levels and are susceptible to external shocks such as component price rises. Prices are often out of the reach of many disabled people because small workshops cannot take advantage of economies of scale. Keeping costs low can be difficult without regular sales or a wheelchair financing system established with government or other donor funding. Therefore, appropriate but sometimes inefficient local workshops can be vulnerable to competition from free or very low-cost wheelchair providers, despite vast gaps in the quality of provision [28].

Therefore, expecting local workshops to take responsibility for wheelchair provision in isolation is not a successful strategy to address the vast global need. To ensure that small, local services can continue to serve their communities in the long-term they must be integrated into a wider national rehabilitation services and structures. Nevertheless, to meet the demand in the short-term, current wheelchair service provision must be developed in a responsible and informed way that puts the user's needs first and contributes towards a sustainable goal. A viable, alternative approach to this critical need is to combine the mass production of appropriate wheelchairs with distribution by trained national staff at the local level.

There is an important difference between mass producing low-quality, inappropriate wheelchair designs for donation without assessment, prescription, fitting or choice and the mass production of wheelchairs that have been designed for effective distribution through local mobility services. Mass production can take advantage of economies of scale to provide wheelchairs for the 20 million people who require them to be mobile. When wheelchairs are effectively distributed through local services that include a range of wheelchair products *and* professional clinical and technical services the wheelchair is a tool for empowerment and the catalyst to an improved quality of life. Importing appropriate, adjustable wheelchairs can reduce in-country costs by

reducing the need for labour-intensive wheelchair fabrication without reducing the quality of the product which can be assembled and repaired by trained technicians when required. This approach contributes to the long-term integration of community services within national rehabilitation systems and structures by strengthening organisational capacity and developing human resources through training.

Ultimately, to ensure that wheelchairs are provided to the community in the long-term in a responsible and sustainable way, locally appropriate solutions must be integrated into national rehabilitation structures with an emphasis on putting the user's needs at the centre of the approach to achieve long-term appropriate provision led by empowered disabled people.

5 Conclusions

This paper has shown that current 'charitable' approaches to wheelchair provision are failing disabled people in low-income countries. A wheelchair that is not adjustable for the user, is unsuitable to the environment and the user's lifestyle and a wheelchair that is not durable or easily repaired negatively impacts on the quality of life of the disabled people who use them. These imports are threatening the development of local production and denying disabled people their right to a product that enhances their mobility and the education about their disability they require to lead full, healthy and active lives.

Furthermore, the provision of any wheelchair is not enough to overcome the barriers to disabled people face and represses the emerging disability movement in low-income countries that is calling for governments to uphold the rights of disabled citizens. Ultimately, wheelchair provision in low-income countries requires a paradigm shift from seeing disability as solely a medical problem to an understanding of the social model of disability. If donors and agencies involved in wheelchair provision for low-income countries continue to fail to recognise the importance of disabled people's inclusion in society and their role in determining the future of wheelchair service provision then they will continue to regard themselves, and be regarded by society, as victims in need of charity, rather than active citizens who have a right to equal participation.

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References

[1] D. Werner "Nothing About Us Without Us: Developing Innovative Technologies For, By and With Disabled Persons" (1998).

[2] K. Moore and R. Yeo "Including Disabled People in poverty Reduction Work: 'Nothing About Us, Without Us.'" *World Development* **31** (3) pp. 571-590(2003).

[3] USAID "Annual Programme Statement" (June 2003).

[4] M. Krizack "It's Not About Wheelchairs". *Whirlwind Wheelchair International* (2003). Accessed from: http://www.whirlwindwheelchair.org/articles/current/article_c02.htm

[5] J. Howitt "Patronage or Partnership? Lessons Learned from Wheelchair Provision in Nicaragua". *International Politics Honors Thesis*. Georgetown University (2005).

[6] C. Rushman and H. G. Shangali (Eds) "Wheelchair Service Guide for Low-Income Countries" *Motivation and Tanzanian Training Centre for Orthopaedic Technology*. (2005).

[7] C. Rushman "Appropriate Technologies for Assistive Devices" In J. D. Hsu, J. W. Michael and J. R. Fisk. *Atlas of Orthoses and Assistive Devices* (To be published in 2006).

[8] Ibid.

[9] C. Rushman (To be published 2006).

[10] N. E. Groce "Health beliefs and behaviour towards individuals with disability cross-culturally" in RL Leavitt (Ed.) *Introduction to Cross-Cultural Rehabilitation: An International perspective* (1999).

[11] D. Werner (1998).

[12] M. Krizack "International Wheelchair Standards Organizing Committee Formed" *Disability World* **27** (2005).

[13] C. Rushman and H. G. Shangali (2005).

[14] Ibid.

[15] J. Howitt (2005).

[16] M Krizack (2005).

[17] Motivation "Donated Wheelchair Fact Sheets" (2005).

[18] D. Werner (1998).

[19] Motivation "Ragama Rehabilitation Hospital: Research pre- & post- Total Rehab project 1997-1999. (1999).

[20] M Krizack (2005).

[21] G. Mukherjee and A. Samanta "Wheelchair charity: A useless benevolence in community-based rehabilitation". *Disability and Rehabilitation* **27** (10), pp. 591-596 (2005).

[22] Ibid.

[23] M Krizack (2005).

[24] G. Mukherjee and A. Samanta (2005).

[25] Motivation (1999).

[26] C. Rushman (To be published 2006).

[27] M Krizack (2005).

[28] C. Rushman (To be published 2006).