References for Neutron Velocity Selectors

MIRROTRON Ltd Company was founded by physicists and engineers of the former Central Research Institute for Physics (KFKI Budapest) in 1991. Its activities are centered on scientific instrumentation, primarily related to neutron scattering. The company has been in good position to take advantage of Hungary's rapid move to market economy and to draw on the experience as well as the achievements of the Hungarian school of neutron scattering. A good example is the installation of a new cold source and supermirror neutron guide system as well as a set of neutron beam experimental stations at the 10 MW Budapest Research Reactor (BRR) in the past few years.

At the moment, MIRROTRON is working with 30 full time employees and regularly helped by about the same number of scientific expert consultants (by case by case contracts). MR's personnel and associated partners have long experience in instrument development, since the Company was formed by those scientists at the Budapest Research Reactor (BRR) who had been involved in many important neutron instrumentation projects in Europe. Some of the Company's leading persons spent several years at various outstanding laboratories such as ILL Grenoble, HMI Berlin, LLB Saclay or FLNP Dubna. The successful reactor and neutron scattering instrumentation upgrading at BRR has been also partly lead by this team. MIRROTRON's scientists have had a dominant involvement in instrument construction for about 16-20 neutron scattering spectrometers at 6 different European laboratories. Concerning neutron guides, MR has delivered neutron optical components or entire guide systems to the following laboratories:

ANSTO - Australian Nuclear Science and Technology Organisation; SNS - Oak Ridge, US; Berlin Neutron Scattering Center; Budapest Neutron Centre; Frank Laboratory of Neutron Physics, Dubna; ISIS T2 Rutherford Appleton Laboratory; Institut Laue Langevin, Grenoble; Laboratoire Léon Brillouin, Saclay; Los Alamos National Laboratory; Argonne National Laboratory; JAEA Japan; CARR Beijing; INPC Mianyang.

Development and production of neutron velocity selectors:

Thanks to the economical changes and the open market system in Hungary since 1990 (MIRROTRON was founded in 1992) the highest quality components and services are now available, at still relatively moderate price. Moreover, with the Budapest Research Reactor (BRR) in operation, selectors and choppers can be developed and thoroughly tested. In 1998 the development and construction of a new type of a high rotation speed, high transmission (90%) selector was started for utilisation with extension to the short wavelength range (from 2 Å and below) and high resolution (down to 5%). The new model is commercially available since 2001.

MIRROTRON is committed in continuous research and development efforts in all device-related area such as large-disk and high-rotation-speed chopper systems, high strength fibre composite disks, and enhanced attenuation capabilities of disks.

In 2002 an agreement was made between the RMS Group and SKF Magnetic Bearings (Canada) for joint production of fast turning devices (e.g. choppers) in neutron scattering applications with supply of magnetic bearing and driving systems by SKF MB. More than 30 selectors are delivered or being delivered throughout the world.

References for Neutron Velocity Selectors

In years 1991 - 2011 Mirrotron received awards for several large contracts for delivery of selectors or complete systems (these contracts have only a partial overlap and a suitable sequence with the current task/proposal), thus the company's capacity has been considerably extended.

For reference examples, the following are listed below:

Institute - Instrument	Model	QTY	Year of Order	Remark	Reference person
LLB – NSE	MDR-13-800-370	1	1985/87		
LLB – SANS	MDR-13-800-370	3	1987/89		
NIST – SANS	MDR-13-420-410	3	1988-90		Ch. Glinka
Kyoto University – SANS	MDR-13-800-370	1	1988		
Tohoku University – SANS	MDR-13-800-370	2	1988		
NTI Portugal – SANS	MDR-13-800-370	1	1989		
JAERI – SANS	MDR-13-420-410	1	1990		
HMI – NSE	MDR-14-390-500(S)	1	1991	Polarised neutrons	
NAEA Serpong – SANS	MDR-14-460-420	1	1992		
BNC – SANS	MDR-13-420-410	2	1992/97		L. Rosta
BNC	MDR-13-420-410	1	1992/97		L. Rosta
BNC – TAS	MDR-35-370-290	1	1993	Harmonic filtering	L. Rosta

Appendix E/6
References on Neutron Velocity Selectors

Institute - Instrument	Model	QTY	Year of Order	Remark	Reference person
LLB – REFLECT	MDR-13-420-410	1	1993		A. Menelle
NIST – SANS	MDR-13-420-410	1	1998		Ch. Glinka
HMI – NSE	MDR-13-420-410/Al	1	1999		C. Pappas
BNC – SANS	MBR-11-300-360	1	2001	Prototype	L. Rosta
ORNL – SANS	MDR-13-420-410	3	2002		G. Wignall
INPC – SANS	MBR-7-420-360	1	2006	High-speed	C. Bo
JRC – SANS	MDR-13-420-410	1	2006		C. Ohms
ICCAS/CIAE– SANS	MDR-13-420-410	1	2007		C. Han
Kurchatov – SANS	MDR-13-420-410	2	2008		M. Avdeev

Total : 25 pcs Multi-Disk model

2 pcs Multi-Blade model

*Codification: **MDR** (Multi-Disc-Rotor) - **15** (nominal resolution at 0 tilt angle in %) - **800** (rotor length) - **500** (disc diameter) (**S**) (Side window, vertical plane tilt angle variation for resolution change), **MBR** (Multi-Blade-Rotor), **Al** (non-magnetic environment)

Publications

1. L. Rosta et al. Report KFKI-1987-79/E (1987)
2. L. Rosta, Physica B **156 & 157**, 615 (1989)
3. L. Rosta, Physica B **174**, 562 (1991)
4. B. Hammouda, Nuclear Instr.& Meth. A **321**, 275 (1992)
5. J.R.D. Copley, Nuclear Instr.& Meth. A **332**, 511 (1993)
6. L. Rosta, J. Füzi, Physica B 350 (2004)
7. L. Rosta, J. Füzi, Physica B 385–386 (2006)