

References for Bender, Tapered and Elliptical Neutron guides

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. The first supermirrors were produced and tested at KFKI by *F. Mezei* in 1974.

Together with the K.J. Lesker Co. (USA) two dual target magnetron sputtering system designed and built for small scale production (total area 0,2m²) of supermirror or other multilayer devices - as a major application - for neutron scattering research was installed at the Budapest plant in 1995/96.

Based on the experience from the existing sputtering machine MIRROTRON completely designed, built and installed the 1st large scale sputtering machine (total area 1,2m²) at year 2000.

For response to the increased demand for supermirror coating and to reduce the production delivery leadtime new investment decided for the 2nd large scale sputtering machine (total area 1,2m²). It is completely re-designed (3D) and built by MIRROTRON based on the most up-to-date knowledge on supermirror coating. Current status: under assembly at MIRROTRON's site and the production is scheduled to early 2011.

MIRROTRON has installed also - in collaboration with the Budapest Neutron Centre - a neutron reflectometer (co-financed by MIRROTRON) on a neutron guide at BRR in order to improve its quality control capacities and insure the direct neutron beam testing of its multilayer products.

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).

Title:	Nr.	Qualification profile:
- Manager:	5 person	engineers
- Scientist:	2 person	PhD
- Mechanical Designer:	10 person	mechanical engineers
- Electrical Designer:	2 person	electrical engineers
- Technician:	12 person	technician

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; Instiut Laue Langevin, Grenoble; Laboratoire Léon Brillouin, Saclay; Los Alamos National Laboratory; Argonne National Laboratory; JAEA Japan; CARR Beijing; INPC Mianyang.

Bender, Tapered and Elliptical Neutron Guide Systems

In years 2000 - 2010 Mirrotron received awards for several large contracts for delivery of entire guides or guide 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 finished projects are listed below:

- **ANSTO Tapered Neutron Guide for the Quasi Laue Diffractometer**

Year of Award: 2004

Contact Person: Roland Moore

The complete system is installed and commissioned.

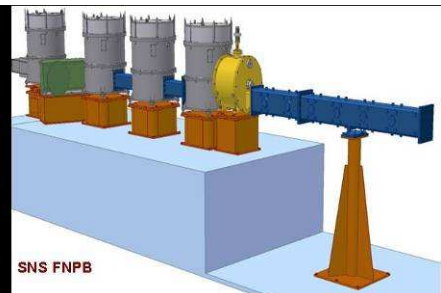
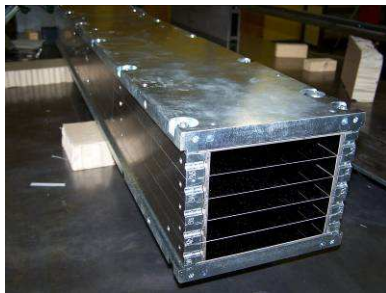


- **SNS FNPB Neutron Guide System**

Year of Award: 2006

Contact Person: Dr. Geoff Greene

The complete guide system with Bender and Straight neutron guide sections with chopper housings, monochromator housing and rotating secondary shutter is installed and commissioned.



- **SNS NOMAD Tapered Neutron Guide System – 16m**

Year of Award: 2006

Contact Person: Dr. Neufeind Joerg

The complete guide system is delivered and installed.

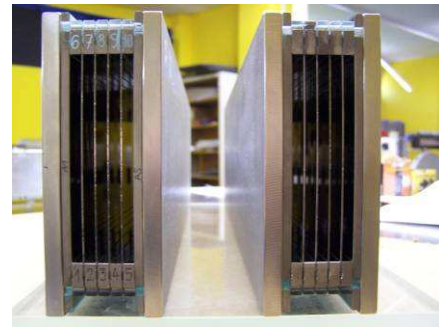


- **SNS TOPAZ Neutron Guide System**

Year of Award: 2006

Contact Person: Dr. Christina Hoffman

The complete guide system with 10m Tapered and Curved Bender guide and 6m Tapered and Curved guide sections are delivered and installed.



- **J-PARC BL-11 Elliptical Neutron Guides (12m)**

Year of Award: 2009

Contact Person: Dr. Arima Hiroshi

The gapless metal-glass free-standing guide system is delivered installed and commissioned.



- **SNS MaNDI Neutron guides (16m)**

Year of Award: 2009

Contact Person: Dr. Leighton Coates

The tapered guide system in special vacuum housing are delivered and installed.



- **J-PARC BL-12 Elliptical Neutron Guides (8m)**

Year of Award: 2009

Contact Person: Prof. Ito and Dr. Sato

The gapless metal-glass free-standing guide system (QC=4) with specially invented quick connection is delivered and installed.



- **ILL -H-122 Beamline Part 4 (12,5 m long)**

Year of Award: 2009

Contact Person: Dr. Michael Kreutz

The polished boron glass guide system built from 2,5m long curved guide assemblies are delivered and installed.



- **J-PARC BL-18 Elliptical Neutron Guides (18m)**

Year of Award: 2010

Contact Person: Dr. Arima

The gapless metal-glass free-standing guide system with QC=5 tapered focusing guide end section is delivered.



- **HZB NL4 Multi-Spectral Extraction Optical System (4m)**

Year of Award: 2010

Contact Person: Dr. Daniel Clemens

The two 2,5 m long optical guide assemblies with QC=3 tapered extraction guides is delivered.



- **BNC FSANS-PGAA Splitter- bender neutron guide system**

Curved bender and straight neutron guides (3-3m) in vacuum housing.

Year of award: 2009

Contact person: Dr. Janos Füzi, Tamas Belgya

The complete system is installed and commissioned.

