| **B N C**<br>**Experimental Report** | *Experiment title*<br>**Determination of thermal equivalent neutron fluxes along the neutron guides at BNC** | *Proposal No.*<br>PGAA00/01<br>*Local contact*<br>Zs. Révay |
|---|---|---|
| *Principal proposer:*<br>László Rosta, Research Institute for Solid State Physics and Optics,<br>Gábor L. Molnár, Institute of Isotope and Surface Chemistry, CRC HAS<br>*Experimental team:*<br>Zsolt Révay, Institute of Isotope and Surface Chemistry, CRC HAS | | *Date(s) of Exp.*<br>22-Nov-2000<br>11-Dec-2000<br>02-Feb-2002<br>*Date of Report*<br>28-Feb-2002 |

**Objectives**

The aim was to determine the neutron fluxes at different positions of the neutron guides.

**Results**

Gold foils were irradiated to determine the thermal equivalent neutron fluxes at several positions of the neutron guides at different phases of the installation of the cold source. The thermal power of the reactor was 10 MW. Gold foils covered with cadmium were also activated to measure the epithermal component of the beam. Irradiation times were typically 20—40 minutes, and 2 hours, respectively. The 411 keV gamma-line from $^{198}$Au decay was counted using the HPGe-BGO detector system of the PGAA facility. The statistical error of the counting was better than 2%. The resulting neutron fluxes are shown in Table 1. The real density of neutrons is 3—4 times less according to the increased reaction rate in the cold beam. Where two flux values are given, two foils were placed on the left and right sides of the beam cross section to determine the inhomogeneity of the beam.

Table 1. Thermal equivalent neutron fluxes and thermal/epithermal ratios along the neutron guides. Fluxes are given in $cm^{-2}\ s^{-1}$.

| Cold source | No | | No | | 25 K | | | 16 K |
|---|---|---|---|---|---|---|---|---|
| Vacuum | No | | Yes | | Yes | | | Yes |
| Distance from the reactor wall | Guide 1 | Guide 2 | Guide 1 | Guide 2 | Guide 1 | Guide 2 | Guide 3 | Guide 1 |
| 6 m | $9.5\cdot10^7$<br>$f = 238$ | $1.35\cdot10^8$<br>$f = 207$ | $1.7\cdot10^8$<br>$f = 318$ | $2.3\cdot10^8$<br>$f = 200$ | $1.03\cdot10^9$ | $1.18\cdot10^9$<br>$f = 1460$ | $1.01\cdot10^9$ | |
| 9 m | | | | | | $7.2\cdot10^8$ | | |
| 12 m (Reflectometer) | | | | | | | $7.7\cdot10^8$<br>$7.3\cdot10^8$ | |
| 16.6 m (TAS) | | | | | $5.72\cdot10^8$ | | | |
| 22 m (SANS) | | | | | $3.1\cdot10^8$<br>$2.8\cdot10^8$ | $1.6\cdot10^8$<br>$2.2\cdot10^8$ | | |
| 33 m (PGAA) | | | | | | | | $3.1\cdot10^8$ |

**References**

Not published.

**Future prospects**

The neutron fluxes for the improved (16 K) cold beam will be determined at the other facilities as well.