Cold and thermal neutrons used in neutrons scattering experiments are produced in nuclear reactors and spallation sources. The neutrons are cooled to thermal or cold temperatures in thermal and cold moderators, respectively. The present study shows that it is possible to exploit the poor thermalizing property of $^{208}$Pb to design a broad spectrum moderator, i.e. a moderator which emits thermal and cold neutrons from the same position. Using $^{208}$Pb as a reflector filter material is shown to be slightly less efficient than a conventional beryllium reflector filter. However, when surrounding the reflector filter by a cold moderator it is possible to regain the neutrons with wavelengths below the Bragg edge, which are suppressed in the beryllium reflector filter. In both the beryllium and lead case surrounding the reflector filter with a cold moderator increases the cold brightness significantly compared to a conventional reflector filter.
Web of Science (2011): Impact factor 1.207
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.894 SNIP 1.11
Web of Science (2010): Impact factor 1.142
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.759 SNIP 1.372
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.755 SNIP 1.077
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.728 SNIP 1.384
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 0.84 SNIP 1.213
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.858 SNIP 1.135
Scopus rating (2004): SJR 0.902 SNIP 1.471
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 0.747 SNIP 1.254
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.724 SNIP 1.139
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.751 SNIP 1.125
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 0.817 SNIP 0.982
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 0.762 SNIP 0.998
Original language: English
Keywords: Spallation, Neutron, Moderators, Reflector filter, Bispectral, Neutronics
Electronic versions:
DOIs:
10.1016/j.nima.2014.09.048
Research output: Research - peer-review › Journal article – Annual report year: 2015