ESRF	**Experiment title:** Reflectance and Optical Constants of Hard X-Ray Multilayer Structures	**Experiment number**: ME-376
Beamline: ID15A	**Date of experiment**: from: 09-Mar-2002 to: 13-Mar-2002	**Date of report**: 30-Aug-2002
Shifts: 12	**Local contact(s)**: Veijo Honkimaki	*Received at ESRF:*

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Report:

Our results have been presented at SPIE, Hawaii, Aug 2002, and will be published in the SPIE proceedings #4851. We have also submitted our manuscript to Applied Optics in August, 2002. The full manuscript is available at <http://cletus.phys.columbia.edu/windt/papers/2002_SPIE_4851_WSiC.pdf>. The abstract of our publication is presented below:

We have developed a new depth-graded multilayer system comprising W and SiC layers, suitable for use as hard X-ray reflective coatings operating in the energy range 100 – 200 keV. Grazing incidence X-ray reflectance at E=8 keV was used to characterize the interface widths, as well as the temporal and thermal stability in both periodic and depth-graded W/SiC structures, while synchrotron radiation was used to measure the hard X-ray reflectance of a depth-graded multilayer designed specifically for use in the range E~150 – 170 keV. We have modeled the hard X-ray reflectance using newly-derived optical constants, which we determined from reflectance-vs-incidence angle measurements also made using synchrotron radiation, in the range E=120 – 180 keV. We describe our experimental investigation in detail, compare the new W/SiC multilayers with both W/Si and W/B_4C films that have been studied previously, and discuss the significance of these results with regard to the eventual development of a hard X-ray nuclear line telescope.