

AN OPTIMIZED BEAMLINE FOR A SHORT STRAIGHT SECTION AT ALADDIN

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The source of the proposed beamline is an insertion device having 14 full periods of 6 cm each designed to fit in the short straight section between bending magnets 2 and 3 of Aladdin.

The beamline does not have an entrance slit; it has only two optical elements in between the source and the exit slit and a single refocusing element after the exit slit. This simple design was chosen with the goal of trying to compensate for the lower flux of the insertion device as compared to the 3.5 m long undulators installed at Aladdin. The first mirror in the proposed beamline is a plane mirror that illuminates the grating at the correct angle such as to zero the defocus at all energies covered by the beamline. The two plan gratings have variable line spacing designed to correct also for the coma and spherical aberrations at one photon energy. The low energy grating (LEG) is optimized for the energy range 8-100 eV and the high energy grating (HEG) for the range 50-270 eV.

The refocusing element is an elliptical toroid which deflects the beam horizontally towards the sample position. The elliptical shape is used to demagnify the source along the horizontal direction by a factor of 12 without introducing coma. The exit slit is refocused along the dispersion direction at the sample position by the sagittal radius of the mirror. The RMS sizes at the sample position with a 10 μm wide exit slit are 49 μm horizontal and 7.5 μm vertical

The flux expected at the sample position will be comparable to that of the existing PGM.