

D13

## **Earth, soil and environmental science research facility at sector 13 of the Advanced Photon Source: I. sector layout and optical design**

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The earth, soil and environmental science component (GSECARS) of the Consortium of Advanced Radiation Sources (CARS), is designing a national research facility to be built at sector 13 of the Advanced Photon Source. The bending magnet beam will be split to allow simultaneous operation of two stations, a monochromatic (8-15 keV) side station and a multipurpose, white-beam/monochromatic end station. The undulator beam line will have two white beam stations which may operate simultaneously using a double crystal monochromator (cryogenic Si) with a thin first crystal. In this mode, the upstream station will accept the monochromatized (4.5-22 keV) beam deflected horizontally by a third (bendable) Ge crystal while the end station accepts the high energy component (blue beam) transmitted by the first crystal. The need for small x-ray beams and broad spectral range have led us to base the focusing aspects of the optic design on grazing incidence mirrors. Both our bending magnet and insertion device beam lines will have long (~1 m), bendable (demagnification < 11; E(cut-off) <70 keV; beam sizes > tens of micrometers). For smaller focal spots, we will use small, dynamically bent Kirkpatrick-Baez mirrors (demagnification 100-400; E(cut-off) <70 keV; beam sizes ~ 1 micrometer). A unique aspect of our insertion device beamline is the ability to deliver focused white beam to the sample, through the incorporation of a power management pinhole in the first optics enclosure.