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Imaging with spherically bent crystals or reflectors M. BITTER, K.W. HILL, F. JONES, S. SCOTT, Princeton Plasma Physics Laboratory, Princeton, NJ, A. INCE-CUSHMAN, M. REINKE, J.E. RICE, MIT Plasma Science and Fusion Center, Cambridge, MA, P. BEIERSDORFER, M.-F. GU, Lawrence Livermore National Laboratory, CA, S.G. LEE, NFRC, Korea Basic Science Institute, Daejeon, Korea, S. MORITA, M. GOTO, National Institute for Fusion Science, Toki, Japan — This paper deals with the astigmatism of spherically bent crystals or reflectors and presents new imaging schemes, which can be applied to a wide spectrum of the electromagnetic radiation, including x-rays and EUV radiation. In Part I, we describe an x-ray imaging crystal spectrometer, where the astigmatism of a spherically bent crystal is being used with advantage to obtain radial profiles of the ion temperature and toroidal plasma rotation velocity in tokamaks and stellarators. In Part II, we present two new imaging schemes, where the astigmatism has been eliminated by matched pairs of spherical reflectors, enabling point to point imaging with almost arbitrary angles of incidence. Potential applications are the x-ray diagnosis of laser-produced plasmas, imaging of biological samples with monochromatic radiation from synchrotron light sources, and EUV lithography. - Work supported by US Department of Energy Contracts: DE-FC02-99ER54512 and DE-AC02-09CH11466.

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