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X-ray Microscopy on Thin Metallic Photonic Crystals VASILICA CRECEA[1], CHRISTOPH RAU[2], XINDI YU[3], PAUL BRAUN[4], IAN ROBINSON[5], University of Illinois at Urbana-Champaign — We present a high-resolution microscopy experiment that uses hard X-rays supplied by Sector 34-ID C from the Advanced Photon Source. The sample of interest is a two-layered inverted nickel photonic crystal with spherical voids of 1900nm diameter and an expected feature size of c. 200nm. Although existing soft X-ray microscopy techniques can reach a sub-hundred nanometer resolution, nickel does not transmit light with energies in the range of the beams used in these cases (c. 1keV), thus rendering them inappropriate for the imaging of such samples. However, with hard X-rays nickel absorbs very little (c. 2-4 percent) light whose energy lies about its absorption edge, which is at 8.4keV. In this new experiment we were able to obtain a magnified image of the Ni photonic crystal with a resolution of 100nm, a result that is unprecedented in this type of system. The experimental set-up uses advanced hard X-ray optical components, such as Kirkpatrick-Baez mirrors, Fresnel zone plates, and a scintillator screen.

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