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First results from the high-resolution x-ray imaging crystal spectrometer on the Large Helical Device N. PABLANT, M. BITTER, L. DELGADO-APARICIO, K. HILL, S. LAZERSON, L. ROQUEMORE, D. GATES, D. MONTICELLO, H. NEILSON, A. REIMAN, Princeton Plasma Physics Laboratory, M. GOTO, S. MORITA, H. YAMADA, National Institute for Fusion Science, M. REINKE, J. RICE, Plasma Science Fusion Center, MIT — A high-resolution x-ray imaging crystal spectrometer (XICS) was recently installed on the Large Helical Device for the 2011 experimental campaign. This diagnostic provides profile measurements of ion and electron temperature profiles in LHD with a spatial resolution of $\sim 2cm$, a time resolution of $\geq 10ms$ and coverage from the core to approximately 60% of the minor radius. This diagnostic can provide ion temperature profiles under conditions where charge exchange recombination spectroscopy (CER) is not possible (high density) or is perturbative to the plasma (low density or frequency heated plasmas). Measurements are by made by using a spherically bent crystal to provide a 1D image of line integrated spectra from helium-like Ar^{16+} emission. Local temperature values can be inferred from these line integrated spectra through tomographic inversion, which utilizes stellarator equilibrium reconstructions provided by the codes VMEC, STELLOPT and PIES (S. Lazerson, et al. this conference). This installation is the first application of the XICS diagnostic technique to stellarator geometry. First experimental results are presented.

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