

Abstract Submitted
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Optical diagnostic of warm dense matter at NDCXI PAVEL NI, FRANK BIENIOSEK, JOHN BARNARD, ENRIQUE HENESTROZA, STEVE LIDIA, DICK MORE — This work is related to recently warm dense matter experiments at Lawrence Berkeley National Laboratory (LBNL), Neutralized Drift Compression Experiment (NDCX) accelerator, which delivers a 30-mA, 350-keV K^+ ion beam. Using the recently-developed technique of neutralized drift compression, the beam is simultaneously compressed longitudinally by a factor of 50, and focused transversely down to a 1 mm spot. The beam pulse is used to pulse heat various target materials, including Al, W, C, Pt and Si, above 3000 K driving samples into two-phase, liquid-vapor states. The next generation accelerator, NDCX-II, is being built and scheduled to be accomplished in 2012. This new machine will, utilize 2 MeV Li^+ ions, to heat 2 micrometer thick metal targets up to 1,5 eV in 0.5 ns. This will allow us investigate near critical points properties of matter. The talk will focus on diagnostics aspects of WDM at NDCX. The fielded diagnostics include a specially developed three-channel optical pyrometer which probes color temperatures of the target at 750 nm, 1000 nm and 1500 nm, with 75 ps temporal resolution. Continuous target emission from 450 nm to 850 nm is recorded by a custom spectrometer, consisting of a high dynamic range Hamamatsu streak camera and a holographic grating. Free expansion of the sample is measured by a VISAR. Future diagnostics for the NDCX-II user facility will be also discussed.

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