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**Laser-driven, picosecond ion beams as probes for warm dense matter** B. MANUEL HEGELICH, KIRK FLIPPO, CORT GAUTIER, BRIAN ALBRITGHT, LIN YIN, MARK SCHMITTT, JUAN FERNANDEZ, Los Alamos National Laboratory, ERIK BRAMBRINK, MATTHIAS GEISSEL, Sandia National Laboratory, JULIEN FUCHS, PATRICO ANTICI, PATRIK AUDEBERT, Ecole Polytechnique, DIRK GERICKE, Univerity Greifswald — Laser-accelerated ion beams have the great advantage over conventional ion beams of retaining the sub-ps pulse duration of the drive-laser. Together with the high beam current of kA-MA this makes them unique probes that enable new classes of experiments. One example of this is ion transport and stopping in hot, dense plasmas, where several competing models predict different effects. We performed a first proof-of-principle experiment, using two short pulse lasers: the first to accelerate the ion beam and the second to generate a hot, dense plasma. The first beam accelerates ions up to $\sim$5 MeV/amu. Half of that beam is than passed through an interaction target that is isochorically heated by the second shortpulse, while the other half remains unperturbed. Two Thomsonparabola particle spectrometers record the ion energy and charge state distributions enabling a direct comparison of perturbed and unperturbed spectra. First results and simulations as well as comparison to ion stopping models will be presented. * Work performed under the auspices of the U. S. DOE by the LANS, LLC, Los Alamos National Laboratory.

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