Stellar opacities in the laboratory using a high intensity laser

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The opacity of the sun radiative zone is key to understanding energy flux in the sun interior as well as its structure. The opacity of the radiative zone is mostly governed by oxygen, iron and neon absorption, but most of the questioning lies on the iron opacity. In 2015, experiments carried out on the Z-machine exhibited large discrepancies between experimental results and modeling. Ever since, only a handful of experiments have been realized to confirm these results, because of the experimental challenge to create in laboratory solar-relevant conditions. In this talk, I will present the results obtained on a new opacity platform at LULI laboratory, based on isochoric heating of iron by an ultra-intense laser. These results will be compared to state-of-the-art atomic simulations.