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6.42 Experimental considerations to observe two ionizing fronts in systems with a sharp absorption edge

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The interaction of radiation with media is a ubiquitous phenomenon. In astrophysics, ionizing radiation interacts with molecular clouds with the fate of the clouds determined by the optical depth of the cloud. In inertial confinement fusion (ICF) radiation interacts with the capsule, ablating material and driving shocks. Recent work by Poujade et al (2015) performed simulations, which indicate that if the opacity of the medium has a sharp edge in the radiation spectral domain a second ionization front can form. This second ionization front can form a second shock, which they termed an edge-shock. One example they consider is radiation from a 100 eV source incident on carbon. In this case, the carbon K-edge (~282 eV) corresponds to the peak of the radiation and the simulation shows the source radiation is deposited at two different locations creating both the main shock and an edge shock. IN ICF simulations, extra shocks are often observed and may be due to this mechanism. We will discuss the experimental considerations to observe both the main and edge shock in such a system. We will also present a preliminary experimental design.

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