Abstract Submitted
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**Shock Compression Response of Calcium Fluoride ($CaF_2$)** SETH ROOT, Sandia National Laboratories — The fluorite crystal structure is a textbook lattice that is observed for many systems, such as $CaF_2$, $Mg_2Si$, and $CeO_2$. Specifically, $CaF_2$ is a useful material for studying the fluorite system because it is readily available as a single crystal. Under static compression, $CaF_2$ is known to have at least three solid phases: fluorite, cotunnite, and a $Ni_2In$ phase. Along the Hugoniot $CaF_2$ undergoes a fluorite to cotunnite phase transition [1], however, at higher shock pressures it is unknown whether $CaF_2$ undergoes another solid phase transition or melts directly from the cotunnite phase. In this work, we conducted planar shock compression experiments on $CaF_2$ using Sandia's Z-machine and a two-stage light gun up to 900 GPa. In addition, we use density functional theory (DFT) based quantum molecular dynamics (QMD) simulations to provide insight into the $CaF_2$ state along the Hugoniot.

[1] P. Kalita et al., *Dynamic XRD, Shock, and Static Compression of $CaF_2$* This conference.

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