Modeling Mach Stem Initiation of 9502 ERIC MAS, LARRY HULL, PHILLIP MILLER, ERIK MORO[1], IAN FLEMING, Los Alamos National Laboratory — Initiation of insensitive high explosives (IHEs) by shock reflection, shock interactions, and Mach stem formation is a considerable safety concern and a complex challenge for HE reactive burn models. We have designed a Mach stem test where the position, size, pressure, and release of a Mach stem can be carefully prescribed. An in-depth description of the experiment and results are presented at this symposium by P.I. Miller. In this talk we will present results from simulations of the Mach stem experiments using the reactive burn model scaled uniform reactive front (SURF) [1]. We will show that modest changes to the release of the Mach stem qualitatively change the initiation of 9502 as measured during the experiment, and we will present SURF model comparisons to the experimental data including X-ray images, FFC, and chirped fiber Brag gratings. While the SURF parameters used in this work were derived from pop-plot data and single fragment impact experiments, we will show that the agreement with the more complex, Mach stem experiments is quite good.

[1]R. Menikoff & M. S. Shaw (2012): The SURF model and the curvature effect for PBX 9502, Combustion Theory and Modeling, DOI:10.1080/13647830.2012.713994

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