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Understanding the Relation of Progenitors and Supernovae through the Study of Circumstellar Material (CSM) MANISHA SHRESTHA, JENNIFER L. HOFFMAN, Univ of Denver, HILDING R. NEILSON, RICHARD IGNACE, East Tennessee State University — Circumstellar material (CSM) around supernovae helps us to uncover the evolutionary connections between these supernovae and their massive progenitor stars. This CSM arises from stellar winds, outflows, or eruptions from the massive star before it explodes and can be detected with polarimetric observations. We use a Monte Carlo-based radiative transfer code (SLIP) to investigate the polarization created by different models for the CSM surrounding Type IIn supernovae. We vary parameters such as the shape, optical depth, temperature, and brightness of the CSM and compare the simulated flux and polarization behavior with observational data. We present results from new simulations that assume a bow shock shape for the CSM. Bow shocks are commonly observed around massive stars; this shape forms when a star moving more quickly than the speed of sound in the local interstellar medium emits a stellar wind that drives a shock wave into the ISM. Since a bow shock projects an aspherical shape onto the sky, light from the central source that scatters in the shock region becomes polarized. We present electron-scattering polarization maps for this geometry and discuss the behavior of observed polarization with viewing angle in the unresolved case.

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