The Identification of Failed Supernovae
HST Proposal 15645

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Cycle: 26
Category: Stellar Physics
Proposal type: GO
Status:

HST Proposal Information:
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Proposal Abstract

We request 41 orbits of HST/ACS F814W imaging of a specially chosen sample of nearby galaxies to identify failed supernovae---the literal disappearance of a massive star after collapse into a black hole. Based on recent theoretical work on how massive stars end their lives, and the apparent lack of stars >18 M_sun exploding as core collapse supernovae, we expect to detect ~5-20 failed SNe, a sample large enough to provide a conclusive test of this idea. These observations will address the long standing mystery of missing core collapse supernova progenitors and test models of black hole formation, with broad-reaching consequences for our understanding of stellar remnants, chemical enrichment, and predictions for gravitational wave event rates.Any failed supernova candidates will be prime targets for the JWST era, both to search for associated cold transients, and to rule out alternative explanations for the massive star's disappearance.;

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