Physics Department Colloquium

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2:00 PM in SE 319A

The Rates of Supernovae, Far and Near

For nearly two decades, the Hubble Space Telescope has been heavily used to locate supernovae in high redshift environments, with the primary goal of improving constraints on the nature of dark energy. Along the way we have made surprising observations on the nature of supernovae themselves, and clues to their elusive progenitor mechanisms, some of which are difficult to reconcile with observations at much lower redshift. From complete volumetric supernova rate histories that now extend to $z > 2$ we find type Ia supernova delay-time distributions are consistent with a power law index of -1, but with the fraction of prompt ($t_d < 500$ Myr) is less than expected from various ground-based surveys. Core collapse supernova rates trace the cosmic star formation rate history, but require stellar progenitors more massive than has been seen in deep studies of nearby events ($M > 20 M_{sol}$). I'll detail some interesting discoveries from our recent campaigns on clusters of galaxies, and also discuss what we expect to find with the James Webb Space Telescope, launching in 2018, and with WFIRST in the 2020s.