Abstract Submitted
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Neutron Stars from the Early Universe RABIA HUSAIN, VOLKER BROMM, University of Texas at Austin — We investigated Population III neutron star remnants to assess the feasibility of detecting one in our Milky Way. First, we used the Press-Schechter formalism to calculate the number of dark matter minihalos, regions where Population III stars form, incorporated into the Milky Way. Then, we determined the amount of star forming gas available per minihalo to find the number of neutron star remnants per minihalo. From this, we discerned that there are about 20,000 Population III neutron star remnants in the Milky Way. Next, we sought to distinguish them from those of other stars. Since they are more massive, it stands to reason that they are also brighter. We calculated a timescale for binary capture, finding that a Population III neutron star will acquire a companion every million years. Due to the bright emission from binaries, we should be able to detect these sources. We are constructing a luminosity function to show the number of neutron stars at a particular luminosity as a function of Eddington luminosity. At the high-luminosity end of this plot, we expect to find the signature of Population III remnants. From this, we can constrain the properties of the first stars, thus guiding direct searches with telescopes, such as the James Webb Space Telescope.

Rabia Husain
University of Texas at Austin

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