

# **Nuclear astrophysics in the multi-messenger era**

**Professor Sanjay Reddy**

**Institute for Nuclear Theory, University of Washington, Seattle, Washington**

## **Abstract:**

Advances in theory and simulations have provided intriguing new insights and connections between diverse astrophysical processes involving neutron stars. In the coming decade(s) we may be able to study some of these extreme phenomena by detecting their electromagnetic, neutrino and gravitational wave emission. I will discuss the associated physics and address how they can help us answer some long standing questions in nuclear astrophysics: (i) where and how are the heavy elements made? (ii) how big are neutron stars and what are the properties of dense matter in their interiors? (iii) what can we learn by detecting neutrinos from the next galactic supernova, gravitational waves from neutron star mergers, and their associated electromagnetic emissions?