

Gravitational wave emission from binary neutron star systems have spectacularly shed light on the role of neutron star mergers as progenitors of sGRBs and even on the equation of state of matter at supranuclear densities. In a time after the first GW detections have been achieved, and while we are eagerly awaiting the next data set from an even more sensitive array of detectors, it is the right time to turn our attention to more exotic sources. I will discuss the peculiar signatures of eccentric binary neutron star sources that can e.g. be assembled by dynamical captures in the dense core of globular clusters. I will discuss recent work on nucleosynthetic yields from such eccentric neutron star binaries and gravitational waves generated by tidally induced f-mode oscillations in the stars. Gravitational waves from f-mode oscillations and their damping carry unique information allowing us to infer vastly more information on the structure of the star than is possible from quasi-circular binaries.