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Heavy ion fusion reactions in stars

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Heavy ion fusion reactions play important roles in a wide variety of stellar burning scenarios. $^{12}\text{C}+^{12}\text{C}$, $^{12}\text{C}+^{16}\text{O}$ and $^{16}\text{O}+^{16}\text{O}$ are the principle reactions during the advance burning stages of massive star. $^{12}\text{C}+^{12}\text{C}$ also triggers the happening of superburst and Type Ia supernovae. The heavy ion fusion reactions of the neutron-rich isotopes such as ^{24}O are the major heating source in the crust of neutron star. In this talk, I will review the challenges and the recent progress in the study of these heavy ion fusion reactions at stellar energies. The outlook for the studies of the astrophysical heavy-ion fusion reactions will also be presented.

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