The first massive black holes: recent discoveries and open questions

Prof. Dr. Marta Volenteri, Institut d'Astrophysique, Paris

The presence of massive black holes in the first galaxies has been predicted theoretically for many years. Until the launch of the space telescope JWST the bulk of observational data hinged on very bright sources — luminous quasars — detected about one billion years after the Big Bang. Now a large number of fainter sources, candidate active massive black holes, have been identified, some at much earlier cosmic times. The extent of the population as well as their peculiar properties in terms of spectral distribution and compactness of the host galaxies challenge standard approaches. I will first discuss the challenges of interpreting these observations and comparing them to theoretical models. I will then connect massive black holes observed via their electromagnetic emission to those that can be detected via emission of gravitational waves: merging massive black holes.