Black Hole High Mass X-ray Binary Microquasars at Cosmic Dawn

Felix Mirabel*[1,2]

[1]Service dÁstrophysique (SAp) – Commissariat à l'énergie atomique et aux énergies alternatives : DRF/IRFU, Université Paris-Saclay – Service dÁstrophysique, CEA-Saclay, DRF/IRFU/SAp, Bât. 709, LÓrme des Merisiers, F-91191 Gif-sur-Yvette Cedex, France, France
[2]Instituto de Astronomia y Fisica del Espacio (IAFE) – Ciudad Universitaria. Buenos Aires, Argentina

Abstract

Theoretical models and observations suggest that primordial Stellar Black Holes (Pop-III-BHs) were prolifically formed in HMXBs, which are powerful relativistic jet sources of synchrotron radiation called Microquasars (MQs).
Large populations of BH-HMXB-MQs at cosmic dawn produce a smooth synchrotron cosmic radio background (CRB) that could account for the excess amplitude of atomic hydrogen absorption at z∼17, tentatively reported by EDGES.

BH-HMXB-MQs at cosmic dawn precede supernovae, neutron stars and dust. BH-HMXB-MQs promptly inject into the IGM hard X-rays and relativistic jets, which overtake the slowly expanding HII regions ionized by progenitor Pop-III stars, heating and partially ionizing the IGM over larger distance scales.

BH-HMXBs are channels for the formation of Binary-Black-Holes (BBHs). The large masses of BBHs detected by gravitational waves, relative to the masses of BHs detected by X-rays, and the high rates of BBH-mergers, are consistent with high formation rates of BH-HMXBs and BBHs in the early universe.
See: http://www.iafe.uba.ar/BH-HMXB-MQs_at_Cosmic_Dawn

*Speaker