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First stars and black holes in the reionization epoch (Invited review)

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The appearance of the first stars about 100 million years after the Big Bang marked the beginning of the Reionization Epoch, an extended process in which the cosmic gas was ionized by the UV photons from the existing luminous sources. Most likely, in addition to stars, black holes also formed during the same epoch as end-products of massive star evolution, from direct collapse of gas clouds, or by stellar merging in dense stellar clusters. These black holes represent the “seeds” out of which observed super-massive black holes powering the most distant quasars were built. I will review the properties of first stars and black holes, their role for reionization, and the tight physical relationships between these two types of sources. I will put particular emphasis on the critical current and future experiments that could allow us to understand in detail these initial phases of cosmic structure formation.

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