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Some remarks on black holes with fluid of strings: solutions, thermodynamics and Hawking radiation

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In the early 1980´s, Letelier introduced a gauge invariant model of a fluid of strings with the aim to treat gravity coupled to these array of strings, in the framework of general relativity. Thus, using the fluid formed by strings as a source of the gravitational field, he obtained a solution of the Einstein equations corresponding to a spherically symmetric space-time. In the case of spherical symmetry, he obtained a generalization of the Schwarzschild solution to the one corresponding to a black hole surrounded by a spherically symmetric fluid of strings.
These results were based on a similar formalism introduced by him, to treat a cloud of strings, which means that the pressure is not taken into account. In this scenario, he obtained a class of solutions of the Einstein equations corresponding to plane-symmetric, spherically and cylindrically symmetric space-times.
The main motivation to construct those models was based on the fact that the universe can be represented, in principle, by a collection of extended objects, like one-dimensional strings, rather than of point particles, in a more appropriate way.
Recent theoretical developments suggest that it is necessary to consider extended objects because they offered a potential alternative to be used as the fundamental elements to describe physical phenomena which occur in the universe. From the gravitational point of view, it is important to investigate, for example, a black hole immersed in a fluid of strings, due to the fact that these sources have astrophysical observable consequences.
In this talk, we obtain the solution corresponding to a static and spherically symmetric charged de Sitter-anti de Sitter black hole immersed in a fluid of strings. We discuss some aspects of the thermodynamics. We also present a discussion about Hawking radiation of particles, in the background under consideration.

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