

## **Recent results and open questions on some nonlocal problems with lack of compactness**

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The talk deals with the existence and the asymptotic behavior of nontrivial solutions for some classes of stationary Kirchhoff problems driven by a fractional integro-differential operator and involving a Hardy potential and different critical nonlinearities. In particular, we cover the delicate degenerate case, that is when the Kirchhoff function  $M$  is zero at zero. In other words, from a physical point of view, when the base tension of the string modeled by the equation is zero: a very realistic condition. To overcome the difficulties due to the lack of compactness as well as the degeneracy of the models we have to make use of different approaches. The results also raise, and leave open, a number of other intriguing questions, which are briefly presented.