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# Current interest and projects

After working on problems in mathematics for some years I suddenly find myself back in physics, with ideas that may inspire students who are looking for a theoretical or experimental project.

My present line of research was inspired by the experience of teaching Physics 232A, Relativity. I used Weinberg's book, but the development that followed would have been the same if I had used any number of other modern or semi modern text. In a word, I came to view certain assumptions with some skepticism. To see a preliminary formulation of the alternative point of view see the papers listed below, especially number 2: "Ideal Stars and General Relativity." The main idea can be summarized as follows: Certain branches of physics have not yet been formulated in terms of action principles; that is a sign of immaturity.

1. "Growth of a Black Hole", J. Geom.Phys. **57**, 167-177 (2006), gr-qc 0508048.
2. "Ideal Stars in General Relativity", Gen.Rel.Grav. **39**, 1971 (2007), gr-qc 0606027.
3. "Cosmology with an Action Principle" (in preparation).
4. "Stability of Polytropes", Phys.Rev. D **77**, 104019 (2008).
5. " Reissner-Nordstrom and Charged Polytropes", L.M.P. **82**, 255-273 (2007).
6. "Heat and Gravitation. I. The Action Principle", arXiv:0812.4990.
7. "Heat and Gravitation. II. Stability", arXiv:0904.0427.

The last two papers may be found here.

My background is in elementary particles, but at present I find myself a student of astrophysics, thermodynamics, hydrodynamics and several other related fields. I am especially interested in those features that are more or less common to all areas.

Paper number 6 is very controversial. I hope that it will stimulate discussion.