Evaluation report on PhD thesis **Exact Spacetimes and Their Physical Properties** by **Jiří Veselý**.

The thesis investigates static axially symmetric solutions containing magnetic field and cosmological constant with high level of detail. Starting with general ansatz for the line element and imposing different assumptions the author arrived at several distinct classes of solutions. These solutions are subsequently analyzed using motion of both charged and uncharged massive particles. Additionally, the conformal diagrams are constructed and both isometries and algebraic types are computed. The solutions are also used to construct shell sources via Israel junction conditions.
The results are well summarized in table C1 and the thesis contains extensive references showing proper literature research. The level of english is very good and the presentation is clear.

Obtaining exact solutions is not an easy task even after imposing symmetries, that is why the presented work adds substantially to the catalog of exact solutions and their interpretation. The author clearly understands the topic in great detail and conducted the research with high level of rigor. This is reflected in the quality of published papers as well.

One of the future plans is to study stability of obtained solutions, which is potentially possible since for the original Bonnor-Melvin solution (a subcase of the general solution presented in the thesis) it was done and shown to be stable. It would be interesting to know whether this applies to the general solution as well.

The presented thesis clearly shows that the author can become successful researcher and I recommend its acceptance as a PhD thesis.

Questions:
1. Can the toroidal compactification of cylinders (representing the symmetry of the solutions) provide physically interesting solutions, e.g. black holes with toroidal horizons, not seen in literature before? How much is such a construction influenced by the form of the magnetic field? It is only hinted at in the thesis.

2. How difficult it would be to generalize the results to rotating case, initially maybe just slowly rotating approximation? Are there some obvious obstacles for some configurations of magnetic field?

3. On conformal diagrams it appears that singularities tend to be timelike in all cases. Is there some clear explanation for this effect?

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