

**"Magnetism in non-centrosymmetric uranium compound: UIrSi<sub>3</sub> – by Mr. Jaroslav Valenta" – doctoral thesis referee report.**

I read Jaroslav Valenta's doctoral thesis work with the aim of being a referee for his work.

The work is presented at a high research level and has even produced several scientific publications.

The work is presented logically and written scientifically and clearly.

The work focuses on a widely studied UIrSi<sub>3</sub> compound with many methods applied.

The work describes both the model preparation and characterization stages and all the new measurements made on it both under high pressure and under an external magnetic field.

The work is clearly analyzed, properly summarized and the conclusions are appropriate to the work.

The work points to many bibliographic sources that support both the theory and the measurements themselves.

The quality of the graphics and the correct use of the physical units are meticulous.

The theoretical background is concise and covers the scope of work and methods of measurement.

Minor notes

- For the sake of job integrity, I think a brief explanation should be provided about the errors-analysis that made in the work.
- a and c should have error bars and fitting index.
- If the error is less than the size of the symbol, it should be noted at work.
- the error bars are missing mostly in the tables (p.38, p. 39 and p. 56).
- in fig 4.34 the Transversal magneto resistance at 2K at different pressures up to 5.8 GPa is presented. the last two graphs at 5.8 GPa showing also the field

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hysteresis, I suggest differing those two in color from the others and between them in the symbol shape.

- In Fig 4.45 and Fig 4.46 the full line and the dashed line have no physical meaning, consider changing it to a guiding line.
- In Fig 4.4 Fig 4.5, Fig 4.7, Fig 4.8 and Fig 4.15 labels are missing.

this work has a new scientific result. this work combines an importance in the area of high-Pressure as is in the area of magnetism.

this thesis proves the ability of the author for creative scientific work, the ability of use many techniques, understand the theory behind and accurate measurements.

I highly recommend accepting this work as doctoral thesis.

the acceptance of the minor correction I suggested will be decided by the committee.

Yours sincerely,

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Proposed questions:

1. what is the pressure distribution in the pressure cell? how that can affect the results?
2. what is the temperature distribution in the pressure cell? how that can affect the results? are both samples in the exact temperature?
3. how hydrostatic is the pressure medium? what happens when the pressure medium is solidify?
4. For how long the high pressure is stable in the pressure cell?
5. How stable is the High Pressure while temperature is changing?
6. Is the electric current driven in the resistivity measurements effects the temperature of the sample?