Disagreement for discrimination in physics in the XXI century

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In the solid-state physics proceeds a fundamental debate on theoretical description of the magnetism and electronic structure of compounds containing transition-metal 3d/4f/5f atoms. This long-lasting debate is associated with understandings and explanation of phenomena known as heavy-fermion phenomena, superconductivity and Mott insulators. Heavy-fermion phenomena have come to physics in 1976 with revealing large heat capacity, linear with temperature, at low temperatures, below the liquid helium temperature (4.2K). The Sommerfeld coefficient of $CeAl_3$, for instance exceeds more than thousand times that shown by conventional metals. In contrary to the predominant in nineties of the XX century of a hybridization mixed-valence Fermi-liquid picture for f electrons theories with underlying their itinerant behaviour one of us (RJR) already from 1991 consequently pointed out the localized character of f electrons also in heavy-fermion compounds and the existence of the discrete electronic structure well known in conventional rare-earth compounds as crystal-field effects. In our understanding in compounds exhibiting heavy-fermion phenomena there coexists a discrete electronic structure characteristic for the very strongly-correlated n f electrons ($4f^1$ (Ce^{3+}), $4f^{13}$ Yb^{3+}, $5f^3$ (U^{3+}) ions) and itinerant electrons responsible for the conduction and metallicity. The developed Quantum Atomistic Solid State theory (QUASST) states that the heavy-fermion excitations are spin-like charge-neutral low-energy excitations, (< 0.2 meV), in contrary to charge excitations expected by the hybridization Fermi-liquid mechanism making possible the experimental distinguishing of both models.

Quite similar discussion proceeds on $3d$ oxides/fluorides - a problem was put by Sir Nevill Mott already more than 50 years ago that $3d$ oxides, having an incomplete $3d$ shell, are insulators but not metallic

as Wilson's band theory would like. Here the fundamental point of controversy is a band or a localized crystal-field based description of d electrons.

A scientific controversy is a quite normal thing in Science - thanks it the Science develops. A problem appears when a group of people or an influential institution prohibits spreading or presentation of another scientific point of view. Really bad things for Science comes when an influential institution makes use of its power via administration decisions or even by a punishment. Though we could disclose here the relevant names of persons and institutions together with the relevant documents let only to present generally this problem to the scientific community because we believe that the scientific truth will finally win as Physics is the experimental exact science.

Here we would recall a famous example of the scientific discrimination - the Galileo case from 1616-1633. There more, that it was recall in January 2008 at the La Sapienza University, where we just have this EPS-CMD meeting, causing the withdrawal of the visit of the Pope Benedictus XVIth at the University of La Sapienza. Working more than 30 years in research, in quite high-level Physics, let mention the University of Amsterdam we can express our deep conviction that the Galileo trial was proceeded with the highest standard. His accusers have tried to find the scientific truth (today everybody realizes that the religious institutions are not from such problems) - during the trial the accusers have formulated exact scientific questions being the clue of the scientific disagreement. The accusers gave simply answers to these questions which we **find today as physically incorrect**. Actually, the arisen problem was not easy but thanks the clear formulation this scientific problem could be solved (after 100 years, but this clear formulation largely helps to develop Physics and Astronomy). We would like to put attention that though his direct accusers were high-level church people similar thinking was characteristic to practically all scientists of that time including of the Rome, Paris, London or Cracow University.

In the problem shown above there is no open discussion, though magnetism and electronic structure are fundamentally important scientific problems in nowadays solid-state physics. Nobody wants to formulate the scientific controversy. For instance, nobody comments or criticizes in the open scientific way any my 150 papers published in most prestigious physical journals. With years we realize that the Galileo case happens quite often also today - they happen when a good science, with inventing of a new paradigm, is being done.

Finally let express our conviction that Science and Physics should develop in friend, honest and well-wishing atmosphere.