Special Issue

Gravitomagnetism and Quantum Mechanics

Message from the Guest Editors

Gravitomagnetism is an ultra-weak effect of general relativity. Its direct detection is comparatively recent and based on analysis of the orbits of satellites around Earth. Indirect evidence may be found in the dynamics of the double pulsar system and other analogous systems. Other experiments exploiting ring lasers have been envisaged or are being implemented.
On the experimental side, it is interesting to investigate the role that could be played by macroscopic atomic systems. On the conceptual side, we know that quantum mechanics is fully compatible with special relativity and conflicting with general relativity. What about gravitomagnetism? Its relevance may be fully negligible because of the smallness of the effects; however, the relevant aspect is what gravitomagnetism, when it is not a simple coordinate effect, has to do with space–time symmetries. Would this have a subtle influence on atomic systems? Formally exiting the domain of gravitomagnetism, we find another interesting possibility, fully compatible with general relativity and connected with symmetries: this is torsion.

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