ID de Contribution: **14** Type: **Invited talk**

Synthetic spin-orbit coupling in an optical lattice clock

mardi 23 février 2016 12:40 (30 minutes)

We discuss a proposal to implement spin-orbit coupling in a 1D optical lattice clock operated with spin polarized fermionic alkaline-earth-atoms. The resulting single-particle and many-body physics can be probed at current clock operating temperatures thanks to the exquisite precision and sensitivity of the JILA Sr optical lattice clock. The system can realize an effective two-leg ladder where the rungs correspond to the two clock states (synthetic dimension), and the legs to the 1D lattice sites. While the former are coupled by the probing laser, the latter are coupled by tunneling. A large flux per plaquette is naturally generated because the clock laser imprints a phase that varies significantly across lattice sites. We propose to use standard spectroscopic tools – Ramsey and Rabi spectroscopy – to probe the band structure and reveal signatures of the spin-orbit coupling, including chiral edge states and the modification of single-particle physics due to s-wave and p-wave interactions.

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