Contribution ID: **21** Type: **not specified**

A Cold-Atom Microwave Clock for Compact Time Keeping

Tuesday, 14 February 2023 14:00 (35 minutes)

We present a cold-atom pulsed optically pumped (POP) microwave atomic clock based on an additively manufactured loop-gap-resonator microwave cavity and grating magneto-optical trap (GMOT). Additive manufacturing allows for almost arbitrary electrode geometries, more difficult to produce with traditional manufacturing. This approach is also highly scalable and requires minimal assembly. The use of a GMOT allows for a significant simplification of the optical requirements for laser cooling and reduces the optical access requirements of the cavity body. In this demonstration we use a single laser to trap and cool a sample of 87Rb atoms, prepare them in the clock-state and read out the resulting populations after microwave interaction. A Ramsey type interrogation scheme is employed resulting in a short-term stability of <2e-11 τ-1/2. This work is a novel approach towards cold-atom frequency standards for the next generation of compact time keeping.

Primary author: Mr BREGAZZI, Alan (University of Strathclyde)

Presenter: Mr BREGAZZI, Alan (University of Strathclyde)

Session Classification: Atoms and Ions