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Photonics integrated trap for a 176Lu+ optical clock

Singly ionized lutetium (176Lu+) is both attractive for high accuracy clock applications [3,4] and well suited for integrated photonics. With the exception of one repump laser at 350-nm, all other laser wavelengths are within the transparency window of silicon nitride (SiN). Leveraging commercially available SiN microfabrication processes, we have designed and fabricated an ion trap with integrated light delivery of the 848-nm clock laser and 646-nm cooling laser. Here we present evaluation of the fabricated photonics structures and progress towards establishing an operational clock on a surface trap. This platform will be used to measure the key environmental factors to characterize clock performance in a chip-based system.

Author: Dr ARNOLD, Kyle (National University of Singapore)

Co-authors: Dr WEST, Gavin (Massachusetts Institute of Technology); Prof. RAM, Rajeev (Massachusetts Institute of Technology); Prof. BARRETT, Murray (National University of Singapore)

Presenter: Dr ARNOLD, Kyle (National University of Singapore)

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