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An integrated approach to beat note locking of lasers

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Trapped-ion based quantum computers rely on frequency and phase locked lasers to perform experiments. Conventionally, this requires the use of bulky RF electronics that hinder scalability as well as inject noise into the system. In this poster, I will discuss the performance of a frequency/phase locking PCB that we have designed to allow for a more efficient and compact beat-note laser-locking solution. I will present data on the locking performance of a 370 nm laser which we use for state initialization, detection and cooling of Ytterbium 171. The PCB is cost effective and easily reproduced, which is advantageous for scalability. The design also allows for multiple channels per board, meaning multiple lasers can be locked using this integrated approach. This is particularly useful for systems with multiple ion species where many lasers need to be locked.

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