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**Rapid Production of Bose-Einstein Condensates at a 1 Hz Rate<sup>1</sup>** DANIEL FARKAS, JAIME RAMIREZ-SERRANO, EVAN SALIM, ColdQuanta, Inc. — The speed at which Bose-Einstein condensates (BECs) can be produced is a key metric for the performance of ultracold-atom inertial sensors, gravimeters, and magnetometers, where production cycle time of ultracold atoms determines sensor bandwidth. Here, we demonstrate production of <sup>87</sup>Rb BECs at rates exceeding 1 Hz. Not only can we create a BEC from a hot vapor in less than one second, but we can continuously repeat the process for several cycles. Such speeds are possible because of the short evaporation times that result when atoms are confined in tight traps. In our case, we magnetically trap atoms with an atom chip that seals the top of one of ColdQuanta's RuBECi®vacuum cells. With RF evaporative cooling sequences as short as 450 ms, we attain nearly pure condensates of  $2x10^4$  atoms. In the future, the apparatus described here will be integrated into a portable system that houses all of the components needed to produce BECs (e.g. lasers, vacuum, electronics, imaging, etc.) in a volume less than 0.3 m<sup>3</sup>.

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