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The use and development of ion dispensers for laser-cooled atomic ion experiments DAVID HUCUL, JUSTIN E. CHRISTENSEN, ERIC R. HUDSON, WESLEY C. CAMPBELL, Univ of California - Los Angeles — Fast, reliable, efficient loading of ions in ion traps is important for laser cooled ion trapping experiments. We utilize a simple surface ionization technique where ions are directly emitted from a platinum surface upon sublimation. This technique of direct ion production has wide applicability to ion trapping experiments and should apply to the direct production of positively charged atomic and molecular species as well as molecular anions. We experimentally demonstrate the ease and flexibility of this technique by directly producing calcium, strontium, cesium, barium, and potassium ions from a heated platinum surface. In addition, this technique is useful for loading rare isotopes into an ion trap. We experimentally demonstrate this by loading large numbers barium ions into an ion trap and distilling rare, isotopically pure ion chains through voltage control and laser heating and cooling. These techniques are directly applicable to the loading of $^{133}Ba^{+}$ ions, a candidate qubit that combines the favorable atomic structure of $^{171}Yb^{+}$, long-lived metastable states to ensure high fidelity detection, and visible optical transitions to leverage existing optical technologies.

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