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### Title

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# A high current, low emittance $\text{Li}^+$ alumino-silicate ion source and injector

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We will present the design of a  $\text{Li}^+$  ion source and injector for the Neutralized Drift Compression Experiment-II (NDCX-II) for warm dense matter experiments. The injector has been designed to use a large diameter ( $\approx 11$  cm)  $\text{Li}^+$ -doped alumino-silicate source with an injected ion kinetic energy of 100 keV, pulse duration of  $0.5\mu\text{s}$ , and beam current of 100mA. Using small prototype emitters, at a temperature of approximately  $1275^\circ\text{C}$ , the space charge limited  $\text{Li}^+$  beam current density of  $J \approx 1\text{ mA/cm}^2$  was obtained for a 0.64 cm diameter emitting area. The lifetime of the ion source is  $\geq 50$  hours while pulsing the extraction voltage at 2 to 3 times per minute (a rate expected in NDCX-II). We are designing and fabricating a larger diameter source, in parallel with continuing R & D effort to increase the life time of the ion source.

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