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A photoelectron source for electrons on liquid helium[1] SHYAM SHANKAR, GUILLAUME SABOURET, WEI ZHAO, FABRICE AMY, ANTOINE KAHN, S. A. LYON, Princeton University — Manipulation of the spins of electrons on the surface of liquid helium is a promising method to implement a quantum computer. One of the challenges in this method is to generate electrons on the helium surface in a reliable and controlled manner. The traditional approach is to use thermionic emission from a tungsten filament. This approach generates many electrons in an uncontrolled manner and heats the low temperature system. An electron source relying on photoemission from a zinc film has been previously described[1] using a high power light source coupled to a fiber. This work has been reproduced in a more compact manner by using a small modular lamp and proximity focussing. However, zinc films tend to oxidize rather quickly. We are studying the use of alternative low work function materials such as samarium that promise better stability.
[1] L. A. Wilen and R. W. Gianetta, Rev. Sci. Instrum. 56(11), November 1985.

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