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Design and fabrication of a surface trap for trapped ion quantum computing[1] WENDING ZHAO, YUE JIANG, ZHICHAO MAO, QUANXIN MEI, ZICHAO ZHOU, LI HE, LUMING DUAN[2], Tsinghua University, IIIS, TSINGHUA UNIVERSITY TEAM — In our lab, we focus on constructing scalable micro ion trap systems for quantum computing and simulation. We are building a micro-fabricated surface trap system which involves trap potential simulation, ion dynamics simulation, the design and fabrication of surface chip trap and other auxiliary setups. We also estimate the heating rate and circuit characters of surface trap experimentally and theoretically. Recently, we finished several versions of surface chip traps which can realize different trap potentials to tune the spacing between the ions. The chip trap was fabricated through the growth of metal coating over a semiconductor substrate with fine structure (~μm). We also built a segmented blade trap system and work on individual ion addressing and laser frequency stabilization. In the future, we will fabricate more complicated structure on the chip which can give us the capability to transfer quantum information between remote ion traps.

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