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Tunneling into a quantum confinement created by a single-step nano-lithography of conducting oxide interfaces ERAN MANIV, ALON RON, MOSHE GOLDSTEIN, ALEXANDER PALEVSKI, YORAM DAGAN, Tel-Aviv University, DAGAN GROUP TEAM — A new nano-lithography technique compatible with conducting oxide interfaces, which requires a single lithographic step with no additional amorphous layer deposition or etching, is presented. It is demonstrated on SrTiO3/LaAlO3 interface where a constriction is patterned in the electron liquid. We find that an additional back-gating can further confine the electron liquid into an isolated island. Conductance and differential conductance measurements show resonant tunneling through the island. The data at various temperatures and magnetic fields are analyzed and the effective island size is found to be of the order of 10nm. The magnetic field dependence suggests absence of spin degeneracy in the island. Our method is suitable for creating superconducting and oxide interface based electronic devices.

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