

COMPACT ION GUN FOR ION TRAP SURFACE TREATMENT IN QUANTUM INFORMATION PROCESSING ARCHITECTURES

Tech ID: 31671 / UC Case 2020-050-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20230054638	02/23/2023	2020-050

BRIEF DESCRIPTION

Electromagnetic noise from surfaces is one of the limiting factors for the performance of solid state and trapped ion quantum information processing architectures. This noise introduces gate errors and reduces the coherence time of the systems. Accordingly, there is great commercial interest in reducing the electromagnetic noise generated at the surface of these systems.

Surface treatment using ion bombardment has shown to reduce electromagnetic surface noise by two orders of magnitude. In this procedure ions usually from noble gasses are accelerated towards the surface with energies of 300eV to 2keV. Until recently, commercial ion guns have been repurposed for surface cleaning. While these guns can supply the ion flux and energy required to prepare the surface with the desired quality, they are bulky and limit the laser access, making them incompatible with the requirements for ion trap quantum computing.

To address this limitation, UC Berkeley researchers have developed an ion gun that enables in-situ surface treatment without sacrificing high optical access, enabling in situ use with a quantum information processor.

SUGGESTED USES

Surface treatment to reduce electromagnetic noise from metallic surfaces of quantum computers.

ADVANTAGES

- » Reduction of electromagnetic surface noise by two order of magnitude
- » In-situ surface treatment without sacrificing high optical access

RELATED MATERIALS

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INVENTORS

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OTHER INFORMATION

KEYWORDS

Quantum Technology,
Superconducting Qubits

CATEGORIZED AS

- » **Optics and Photonics**
 - » All Optics and Photonics
- » **Communications**
 - » Optical
 - » Other
- » **Computer**
 - » Hardware
- » **Materials & Chemicals**
 - » Nanomaterials
 - » Superconductors
- » **Nanotechnology**
 - » Electronics
- » **Security and Defense**
 - » Other
- » **Semiconductors**
 - » Materials
 - » Other

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