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(54) **MULTIMODE SUPERCONDUCTING CAVITY RESONATORS**

(71) Applicant: **Yale University**, New Haven, CT (US)

(72) Inventors: **Chan U Lei**, Stamford, CT (US);  
**Suhas Ganjam**, Fairfield, CA (US);  
**Lev Krayzman**, New Haven, CT (US);  
**Robert J. Schoelkopf III**, Madison, CT (US);  
**Luigi Frunzio**, North Haven, CT (US)

(73) Assignee: **Yale University**, New Haven, CT (US)

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(57) **ABSTRACT**

Techniques are described to construct an electromagnetic resonator by arranging a resonant structure within a superconducting cavity. The architecture of the design may provide a low loss superconducting cavity resonator that may exhibit multiple modes. The multimode nature of this resonator is produced in part by the resonant structure in such a way that allows the modes of the resonator to be adjusted through adjustment of the resonant structure rather than by having to alter the physical dimensions of the cavity, as would otherwise be required in a conventional superconducting cavity resonator. In some embodiments, the resonant structure may include a suspended superconductor comprising metal and/or metallized parts.

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