LICENSING OPPORTUNITY: CHIP-SCALE ATOMIC **BEAM SYSTEM**



DESCRIPTION

Problem

Current atomic beam systems (such as Cs beam tubes for atomic clock) exist either in lab-scale vacuum systems or in custom vacuum tubes.

Invention

The invention is a device for creating a collimated atomic beam in an evacuated vacuum package fabricated from lithographically defined or machined, planar structures and with components to source atomic vapor and passive pumps to maintain vacuum conditions.

We have developed a chip-scale system for producing an atomic beam.

BENEFITS

Potential Commercial Applications

Applications include:

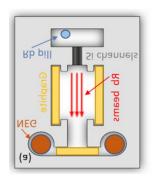
- Chip-scale atomic clocks
- Interferometers

Chip scale clocks are primarily used in cell phone base stations and underwater oil and gas exploration.

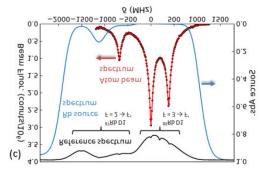
Competitive Advantage

This invention provides a lithographically fabricated process to realize atomic beams with high collimation in a more manufacturable and compact package.

Our value added is to reach better long-term instability than vapor cell chip-scale systems in a smaller package than conventional Cs beam systems.







Depiction of a miniaturized atomic beam source: (a) Schematic of the Rb beam source; (b) Image of assembled device; (c) Rb fluorescence spectrum measuring the transverse velocity distribution of the atomic beam, and Rb absorption spectrum measuring the Rb vapor density feeding the channel array. A saturated absorption spectrum from a natural abundance Rb cell is included for reference.

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