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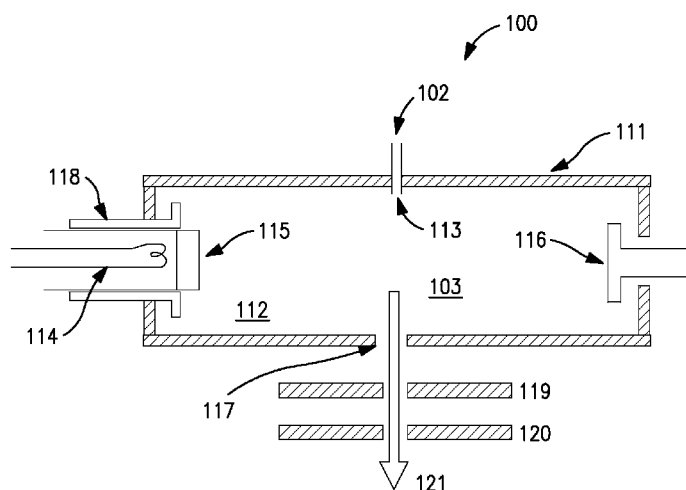
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**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a  
patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the  
earlier application (Rule 4.17(iii))

[Continued on next page]

- (54) **Title:** SILICON-CONTAINING DOPANT COMPOSITIONS, SYSTEMS AND METHODS OF USE THEREOF FOR IM-  
PROVING ION BEAM CURRENT AND PERFORMANCE DURING SILICON ION IMPLANTATION



Schematic of an ion source apparatus

**FIG. 1**

(57) **Abstract:** A dopant gas composition, a system and method thereof for improving beam current during silicon ion implantation are provided. The silicon ion implant process involves utilizing a first silicon-based co-species and a second species. The second species is selected to have an ionization cross-section higher than that of the first silicon-based species at an operating arc voltage of an ion source utilized during generation and implantation of active silicon ions species. The active silicon ions produce an improved beam current characterized by maintaining or increasing the beam current level without incurring degradation of the ion source when compared to a beam current generated solely from SiF<sub>4</sub>.



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