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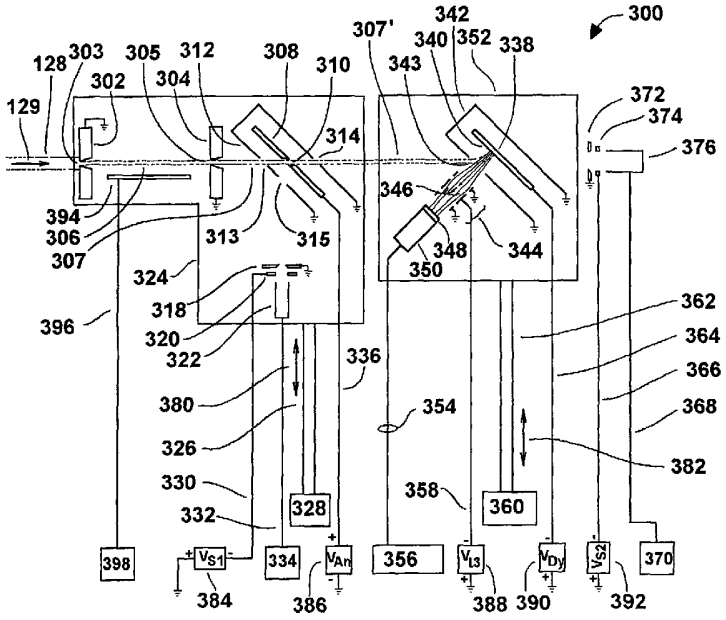
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[Continued on next page]

(54) Title: METHOD OF AND APPARATUS FOR MEASUREMENT AND CONTROL OF A GAS CLUSTER ION BEAM



(57) Abstract: Methods and apparatus (300) are disclosed for measuring controlling characteristics of clusters in a cluster ion beam (306), including average cluster ion velocity v, average cluster ion mass m, average cluster ion energy E, average cluster ion charge state q, average cluster ion mass per charge $(m/q)_{average}$, and average energy/charge $(E/q)_{average}$. The measurements are employed in gas cluster ion beam processing systems to monitor and control gas cluster ion beam characteristics that are critical for optimal processing of workpieces by gas cluster ion beam irradiation.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US04/02196

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G01N 27/00, 27/62; G01R 31/305; H01J 49/00,47/00
US CL : 324/71.3,464,751;250/281,288,492.2,305

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 324/71.3,464,751;250/281,288,492.2,305

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,814,194 A (DEGUCHI et al.) 29 September 1998 (29.09.1998) the entire document	1-34
A	US 5,644,220 A (URS et al.) 1 July 1997 (01.07.1997), the entire document	1-34
A	US 4,559,096 A (Friedman et al.) 17 December 1985 (17.12.1985), the entire document.	1-34
A	US 5,153,430 A (GAMMEL et al.) 06 October 1992 (06.10.1992), the entire document.	1-34
A	US 6,060,718 A (BRAILOVE et al.) 09 May 2000 (09.05.2000), the entire document.	1-34
A	Toyoda N. et al., Surface Processing by Gas Cluster Ion Beam. Ion Implantation Technology, IEEE, Proceedings of the 11th International Conference on , 16-21 June 1996 Pages:808 - 811.	1-34
A	Mack, M.E. et al. Design issues in gas cluster ion beamlines. Ion Implantation Technology, IEEE, Proceedings of the 14th International Conference on , 22-27 Sept. 2002 Pages:665 - 668.	1-34

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