DESIGN AND OPERATING EXPERIENCE ON LASER CAVITY IN A VACUUM OF 10-10 TORR

M. Velghe

To cite this version:

M. Velghe. DESIGN AND OPERATING EXPERIENCE ON LASER CAVITY IN A VACUUM OF 10-10 TORR. Journal de Physique Colloques, 1983, 44 (C1), pp.C1-387-C1-388. <10.1051/jphyscol:1983139>. <jpa-00222568>

HAL Id: jpa-00222568
https://hal.archives-ouvertes.fr/jpa-00222568
Submitted on 1 Jan 1983

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers. L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
DESIGN AND OPERATING EXPERIENCE ON LASER CAVITY IN A VACUUM OF $10^{-10}$ TORR

M. Velghe

Laboratoire de Photophysique Moléculaire CNRS* and LURE, Bâtiment 213, Université de Paris-Sud, 91405 Orsay Cedex, France

Abstract: The length of the A.C.O. storage ring laser is 5.50 meters, on each side of the undulator is a vacuum system mounted with bellows in which the laser cavity mirrors are placed. The mechanical feed thoughs for the mirror adjustments have an accuracy of 1 μmeter for the length $10^{-6}$ Rd. for the angles.

Adjustment of the cavity length: The cavity length is adjustable only at one end. A translation stage is mounted on rectilinear rails, two opposed micrometers drive the gross and the fine displacement.

Adjustment of the mirror angles: A gimbal suspension supports the mirrors through a ball joint. Angular displacement occurs about a point at the center of the front surface of the mirrors. Spring loaded pushers opposite the micrometers permit a large range of adjustment without play. Very flexible bellows have been used on each side of the gimbal system to permit easy adjustment.

Mirror replacement: The two cavity mirrors are mounted in stainless steel holders which can be fixed at the center of suspension system. Special tools have been constructed to permit the extraction of these holders once the chamber is isolated from the storage ring vacuum by a gate valve.

Extraction mirrors and iris diaphragm: inside each vacuum chamber there is a device with removable 45° extraction mirrors which permit an external laser beam to enter and leave the vacuum again via side windows, an essential capability if gain or bunch lengthening measurement are to continue while the laser mirrors are in place. When the extraction mirror at one end is swing aside, its place is taken, by a iris diaphragm which can be adjusted in the two transverse directions and in its operative in order to allow mode selection in the laser cavity.

---

*Laboratoire Associé à l'Université de Paris-Sud.
Stored spontaneous emission as a function of the optical cavity length: a) $L = L_0$, b) $L = L_0 - 5 \text{ mm}$, c) $L = L_0 + 3 \text{ mm}$.