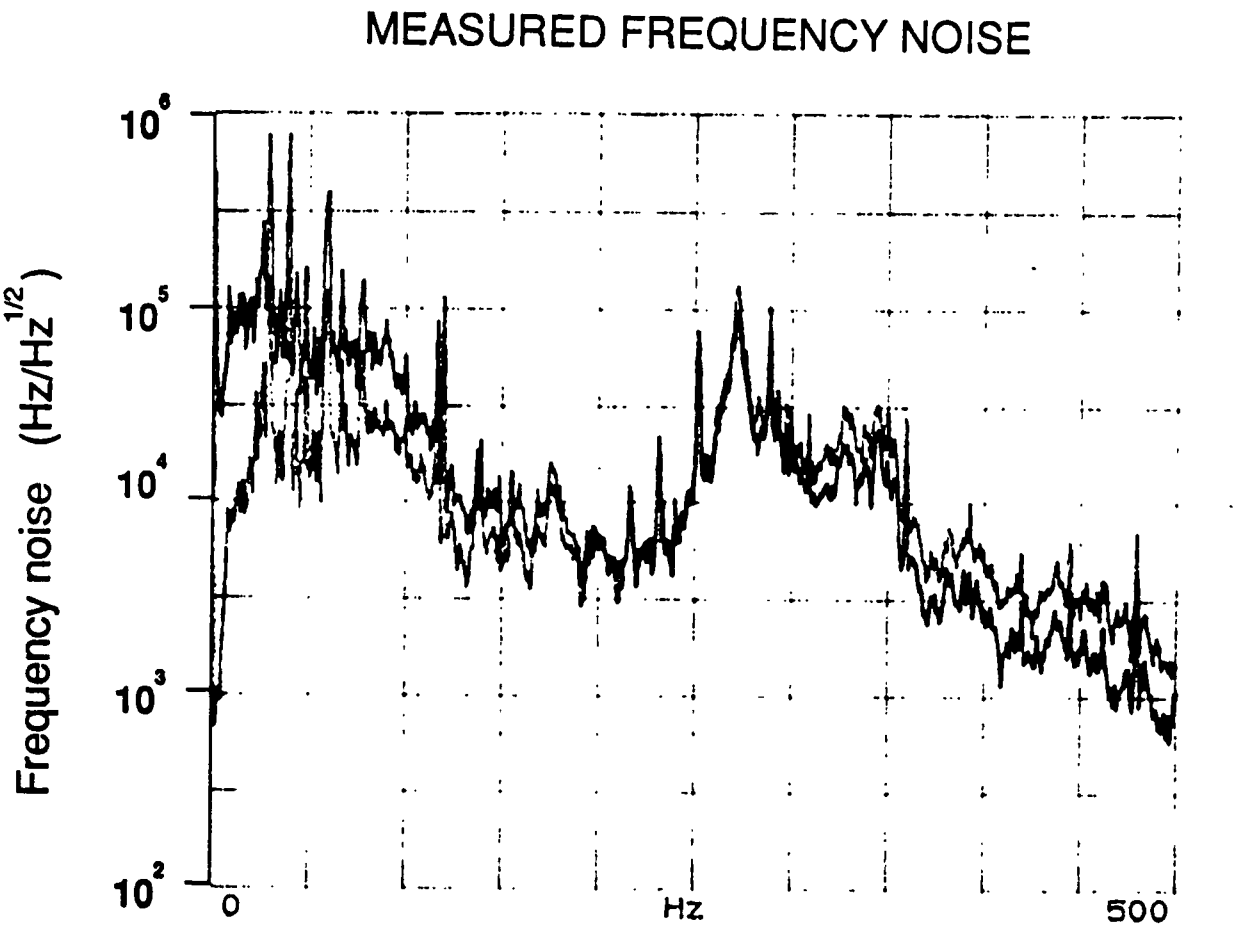
LASERS AND INPUT OPTICS

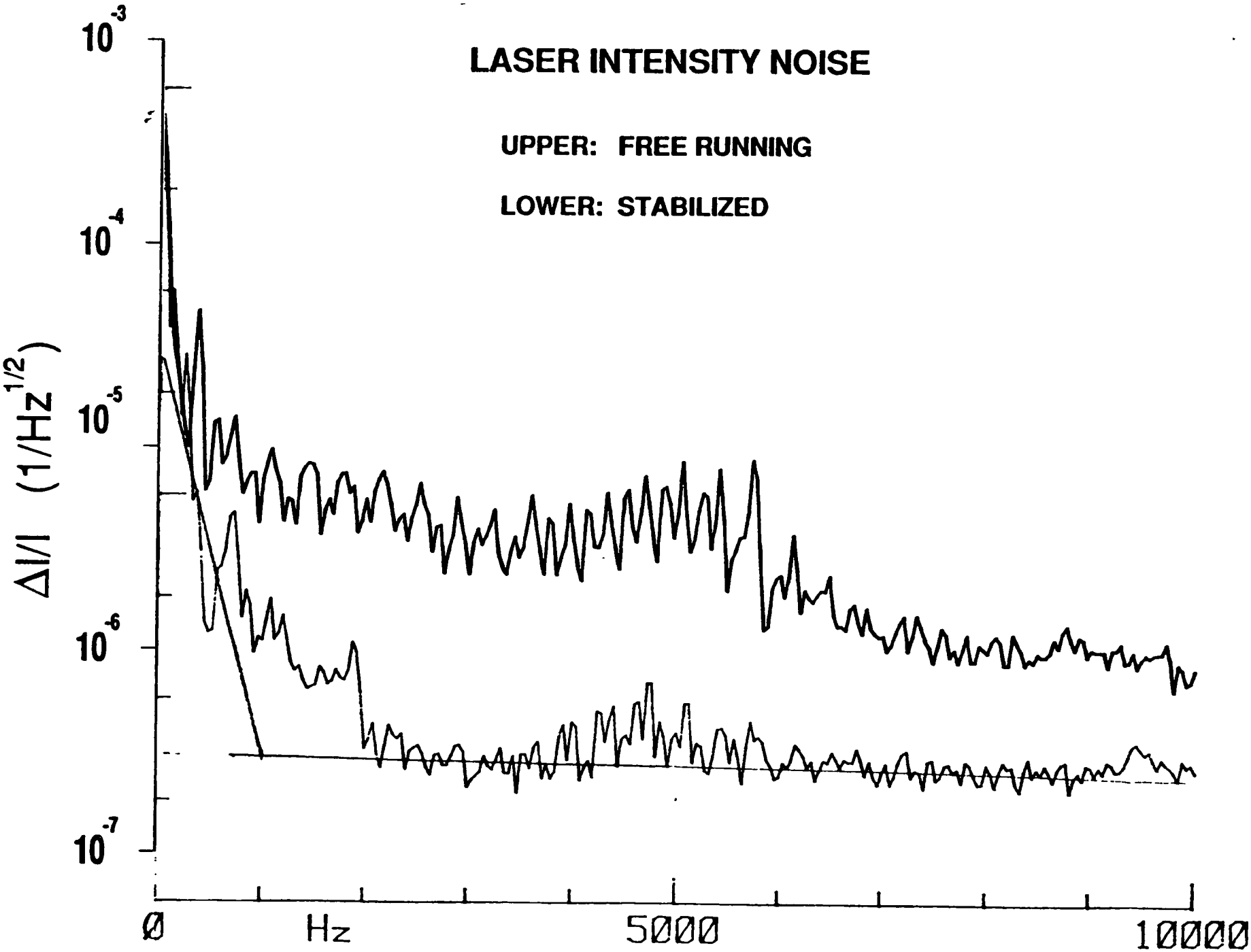
STABILIZATION OF A COMMERCIAL ARGON ION LASER

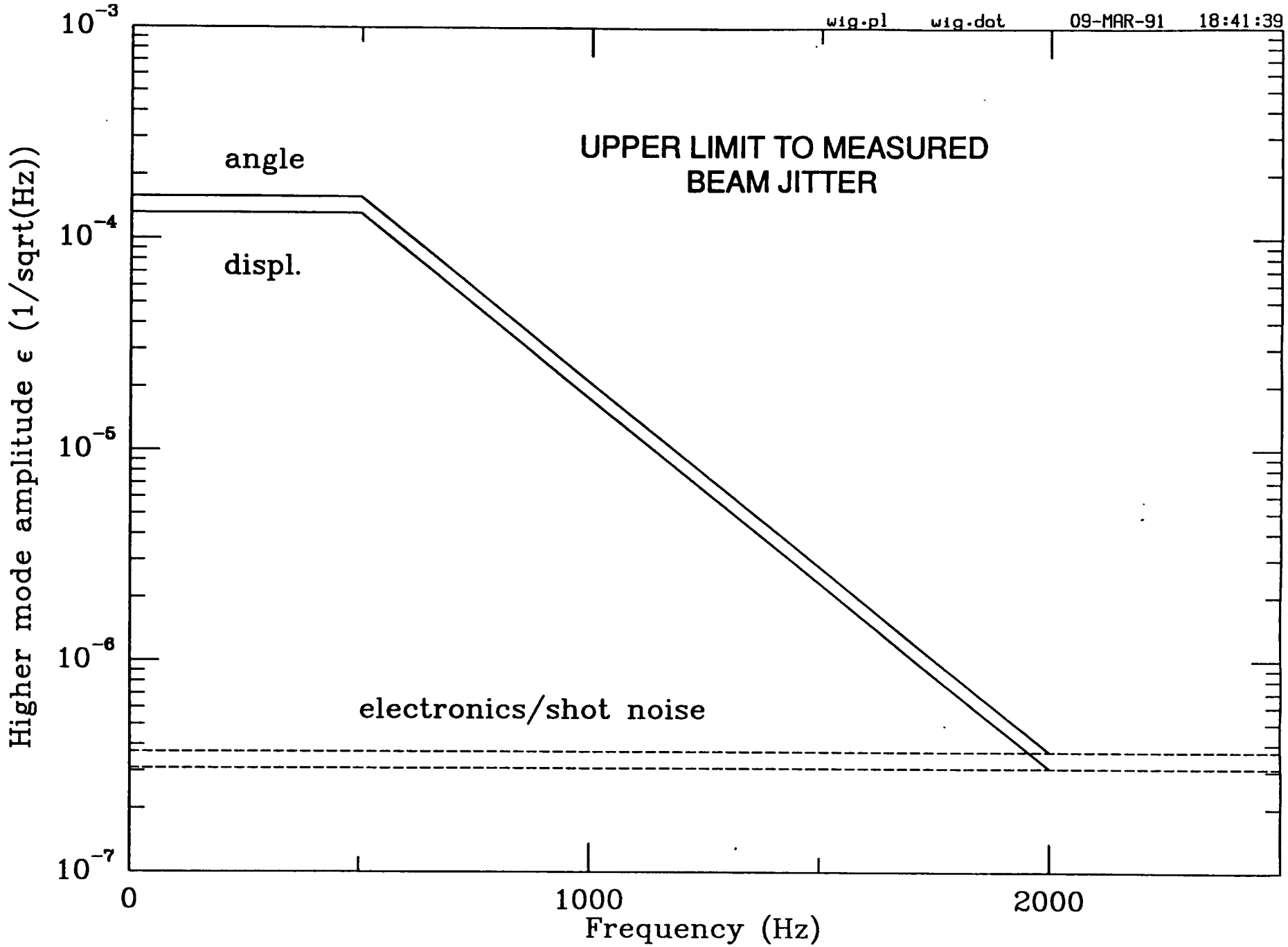
A. Abramovici

June 9, 1993

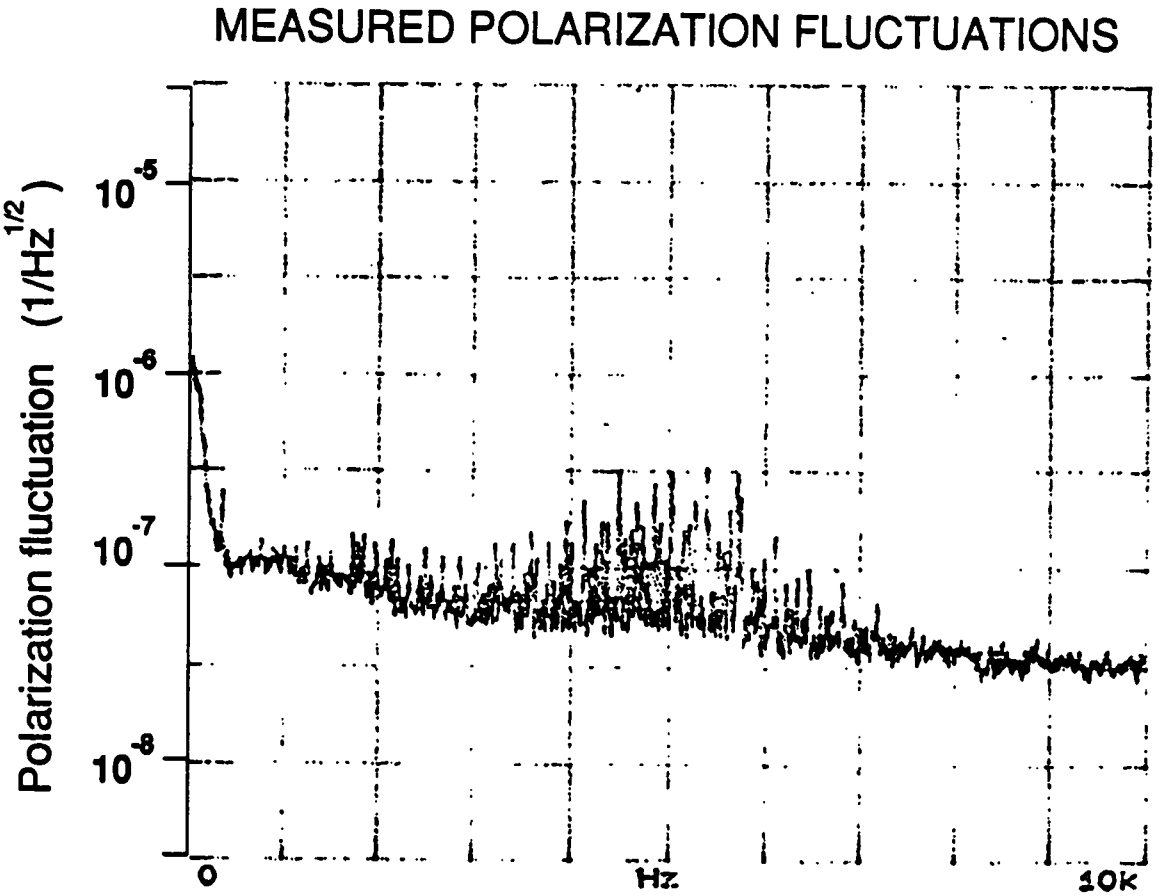
PERFORMANCE OF FREE RUNNING LASER



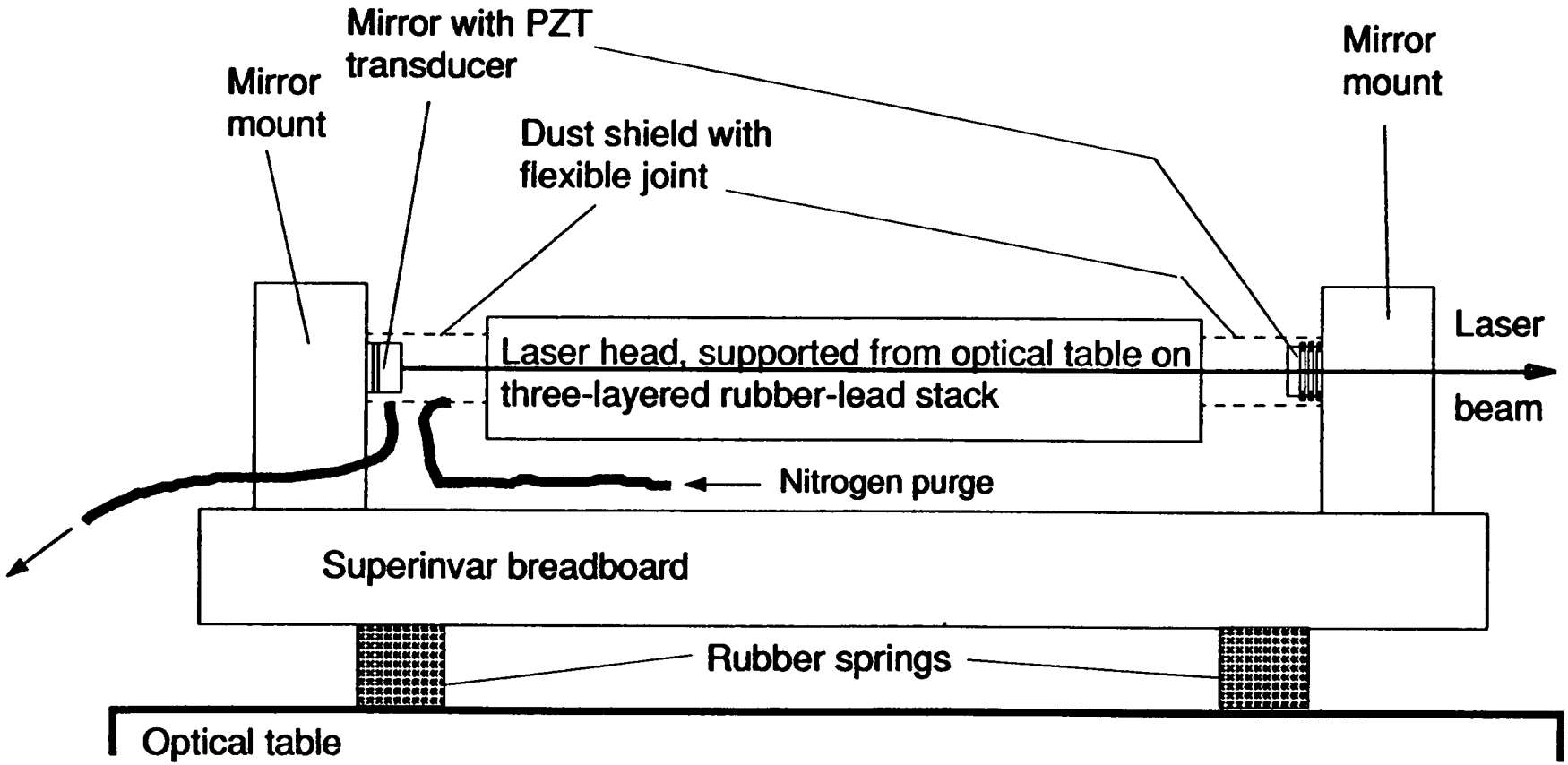

LASER INTENSITY NOISE
UPPER: FREE RUNNING
LOWER: STABILIZED
ΔI/I (1/Hz^1/2)
10^-3
10^-4
10^-5
10^-6
10^-7
Ø
Hz
5000
10000


wig.pl wig.dot 09-MAR-91 18:41:39
UPPER LIMIT TO MEASURED
BEAM JITTER
angle
displ.
electronics/shot noise
Higher mode amplitude ε (1/sqrt(Hz))
10^-3
10^-4
10^-5
10^-6
10^-7
0
1000
2000
Frequency (Hz)

PERFORMANCE OF FREE RUNNING LASER

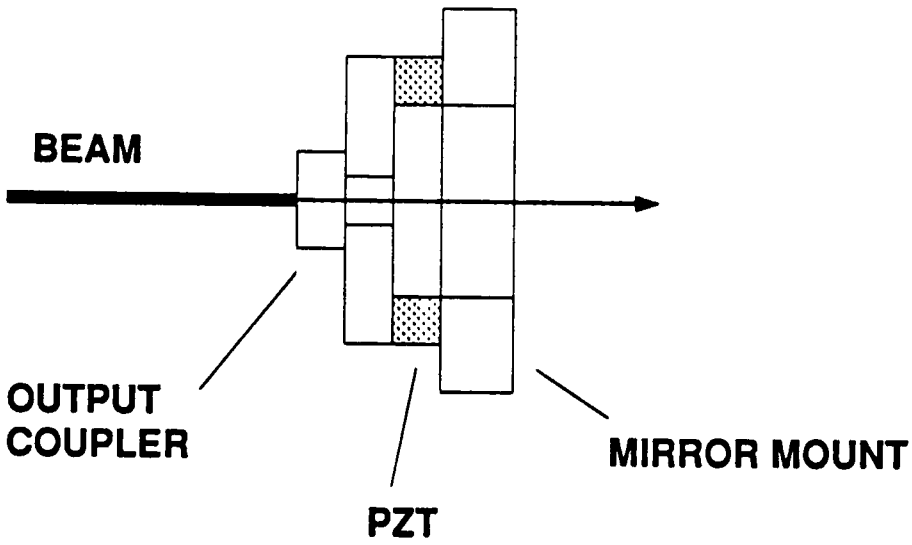


REBUILDING OF COMMERCIAL ARGON ION LASER

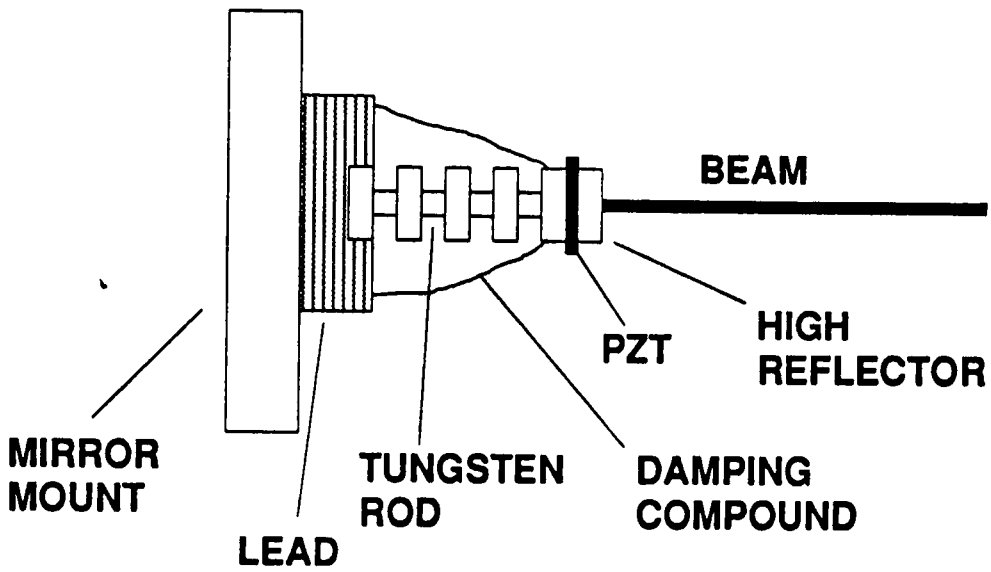


DETAILS OF LASER MIRROR MOUNTING

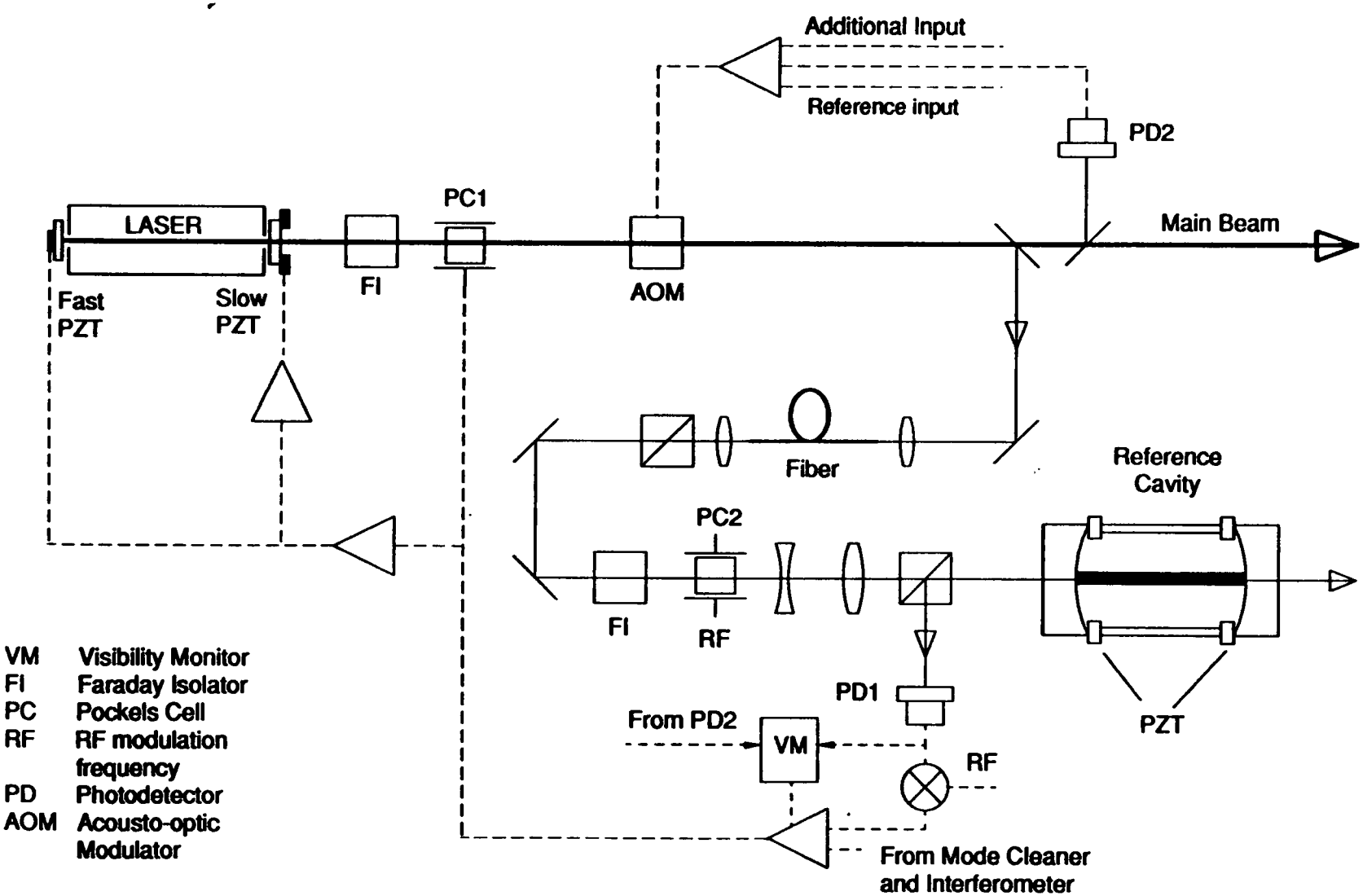
OUTPUT COUPLER (SLOW PZT)



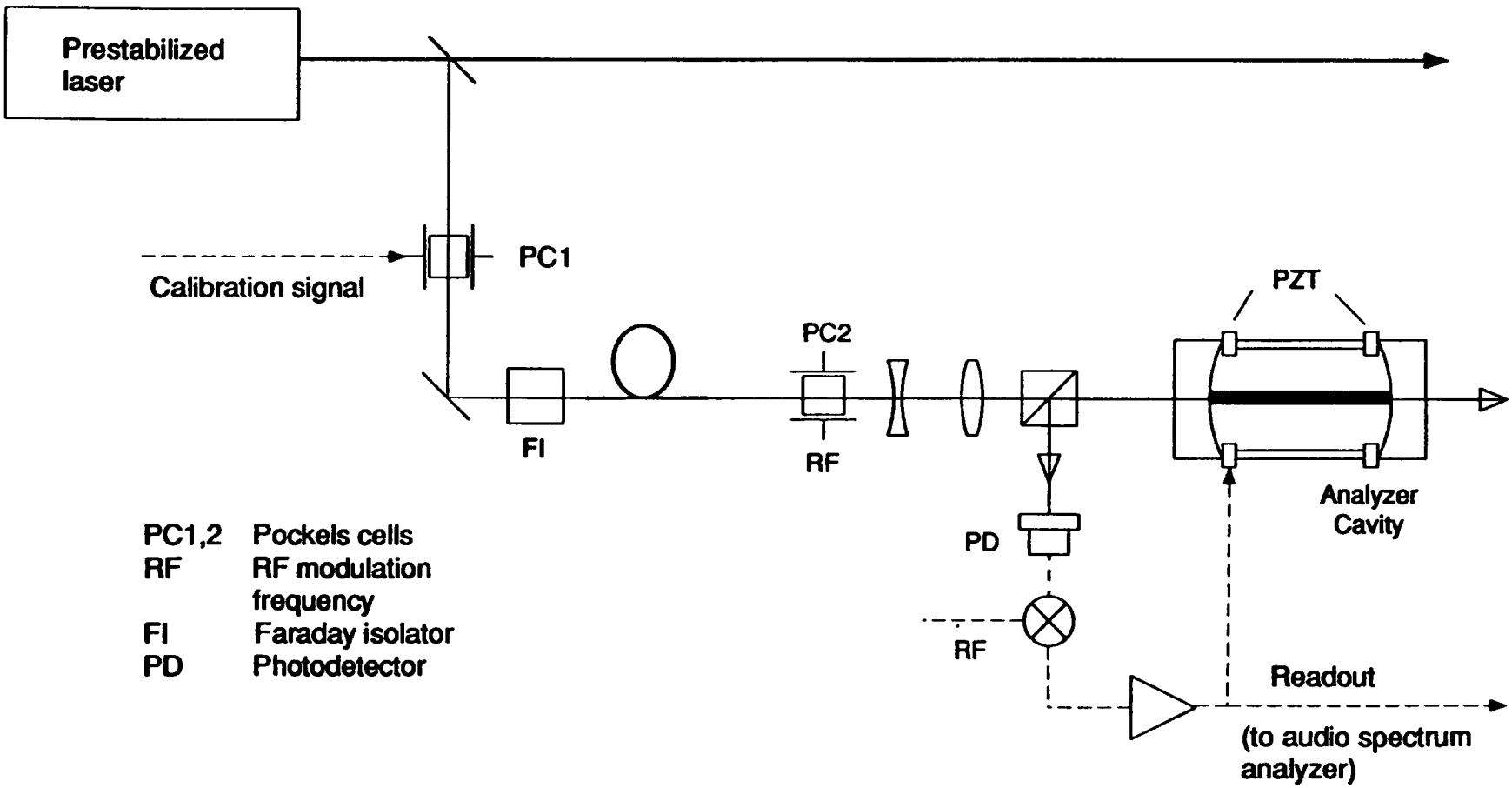
HIGH REFLECTOR (FAST PZT)



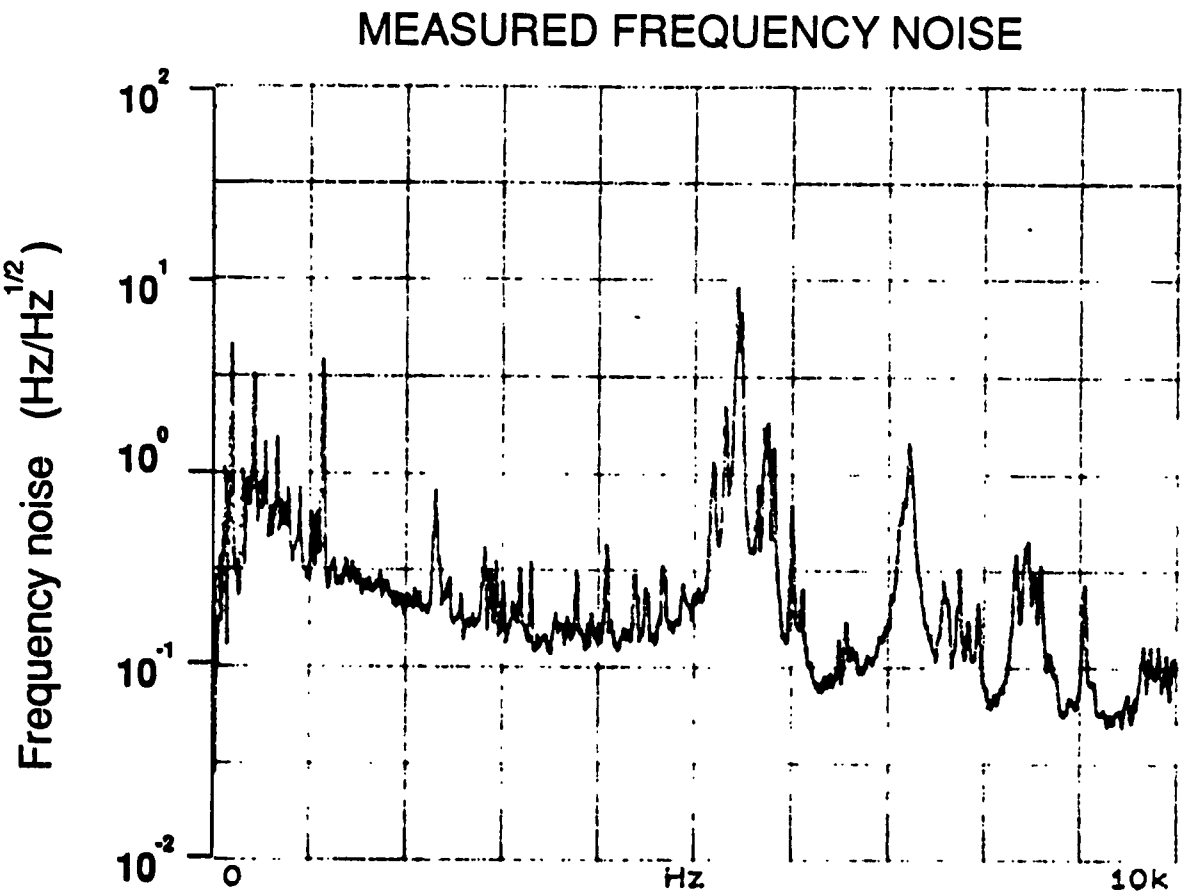
PRESTABILIZED LASER



MEASUREMENT OF PRESTABILIZED LASER FREQUENCY NOISE



PERFORMANCE OF STABILIZED LASER



LONG TERM BEHAVIOR: NO MODE HOPPING

NEEDED NOISE SUPPRESSION FACTORS, WITH PRESTABILIZED LASER

(at 100 Hz)

Noise type	Initial interferometer	Subsequent, advanced interferometers
Frequency noise	$1.7 \cdot 10^6$	$9 \cdot 10^7$
Intensity noise	50	2500
Beam jitter	75	3750