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LARMOR PRECESSION MEASUREMENT OF THE NUCLEAR g-FACTOR OF RADIUM ISOTOPES IN FAST BEAMS

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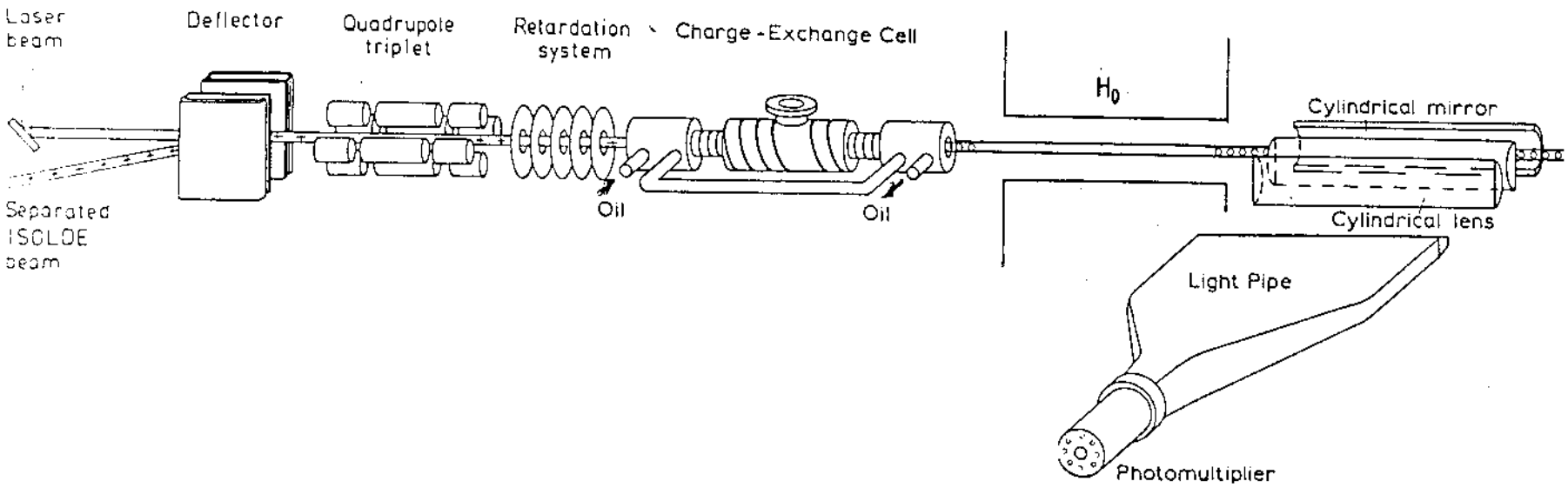
SUMMARY

The aim of this experiment is to directly determine the nuclear g_I factor of a radium isotope.

The experiment is based on the observation of the Larmor precession, in a static magnetic field, of the nuclear moment to be measured.

The experimental set-up is about the same as the one used in collinear spectroscopy experiments. A collinear light beam, from a single mode C.W. dye laser, interacts with the fast atomic beam and induces an alignment (or an orientation) of the magnetic moment. The aligned moment precesses then in a strong static field H_o. The final alignment at the exit of the magnetic field is detected by monitoring the laser induced atomic fluorescence. The periodicity of the fluorescence signal versus the amplitude of H_o is a direct measurement of g_I.

With conventional static field strength H = 10^4gauss and an interaction length of 22 cm, up to eleven fringes are observable for ^{225}Ra. Under these conditions the archivable accuracy is certainly much better than 5%.



Experimental Set-up