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8.6 10 μA Accelerated Polarized Beams At SIN?

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The SIN polarized source had been updated at the time of the Santa Fe symposium [1] by the installation of a new ionizer. An atomic beam source with nozzle cooling has been tested now and will be installed before August 1985.

Fig. 1. shows the main features of the atomic beam source. In order to take advantage of the high acceptance of the sextupoles for a cold beam (about 35 K. average temperature) it is necessary to bring the nozzle rather close to the skimmer; this causes differential pumping to lose efficiency, which is why only two vessels separated by the skimmer and hence only two pumps, are used.

Experimental optimization of the size of the skimmer, of the distance between nozzle and skimmer and of the coating of the cold nozzle to avoid too high recombination rate is still going on. Using a compression chamber which had been calibrated on the room temperature source, we have observed stable cold beam fluxes of $2*10^{16}$ atoms/sec. This corresponds to a factor 6 increase in the produced beam intensity, that is more than 100 μA of polarized protons within the acceptance of the axial injection beam line of the cyclotron, or more than 10 μA of accelerated dc beam. First experimental results will be presented at the actual conference.

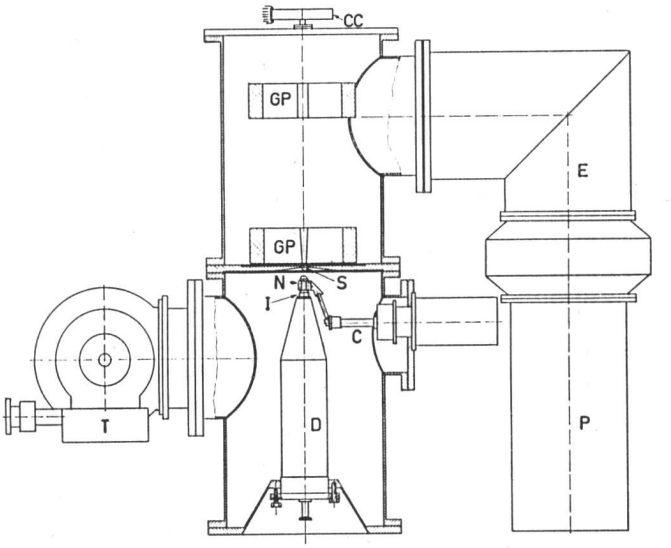

Fig. 1. Cold atomic beam source. D: water cooled dissociator, S: skimmer, 6P: sextupole, CC: compression chamber with B.A. gauge, N: copper nozzle, I: nozzle fixation made of strong isolating material, T: 2000 l/sec. turbomolecular pump, P: 3000 l/sec. diffusion pump, E: elbow ventil, C: cold head.

Reference

1) S. Jaccard, H. Einenkel: Polarization Phenomena in Nucl.Phys.-1980, AIP Conf.Ser.No 69, ed. G.G.Ohlsen et al.(AIP,New York,1981)Part 2,p. 904