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SUMMARY

ANTIPROTON-PROTON GLORY SCATTERING

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ABSTRACT

$\bar{p}p$ and K^-p backwards scattering cannot be mediated by particle exchange. Very low cross sections were found at 5 and 6.2 GeV/c, the highest momenta where these processes have been measured. Three reactions mechanisms could account for such processes: direct channel resonances, two particle (Regge cut) exchange, and glory scattering. The latter is distinguished by a very slow average energy dependence ($d\sigma/du \sim s^{-1}$) and is not ruled out for $\bar{p}p$ when the ISR proton profile function is used.

We propose to measure $\bar{p}p$ backwards scattering between 5 and 20 GeV/c using the Omega spectrometer exposed to the high flux S1 beam (3×10^7 π^- and 10^6 $\bar{p}$ per 10^{12} p, above 10 GeV/c). A fast proton trigger provides, above 10 GeV/c, several fitted events per day and per nanobarn integrated cross section. The covered cross section amounts, at 12 GeV/c, to 1-100 nanobarn depending on whether the average cross section is the same as at 90° c.m., or whether it is glory-scattering like. Above 8 GeV/c, we obtain also K^-p backwards scattering, at somewhat lower luminosity.

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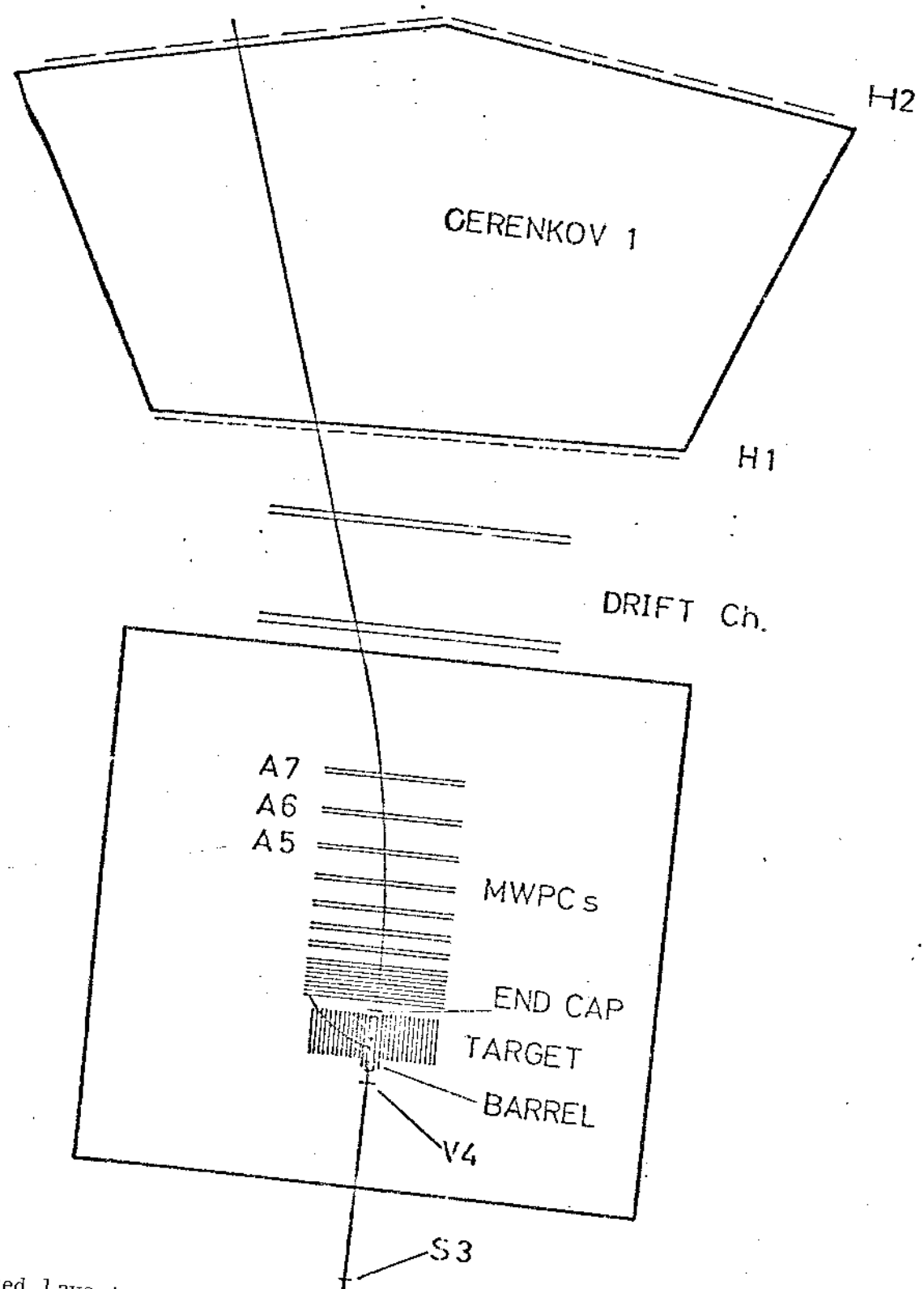
*) Yu. Galaktionov, from ITEP-Moscow, is also considering to participate in this proposal.



Required layout of the Omega spectrometer. The trigger is done in three steps and uses S3, the barrel hodoscope, C1 in veto, and the y coordinates of H2, H1, A7, A6 and A5. The side chambers are turned and detect the recoils with good efficiency. Beam equipment (proportional chambers, one CEDAR and two threshold Cerenkov counters) not shown. The event shown is $\bar{p}p \to p\bar{p}$ at 12 GeV/c, $u = -0.25$ $(GeV/c)^2$.