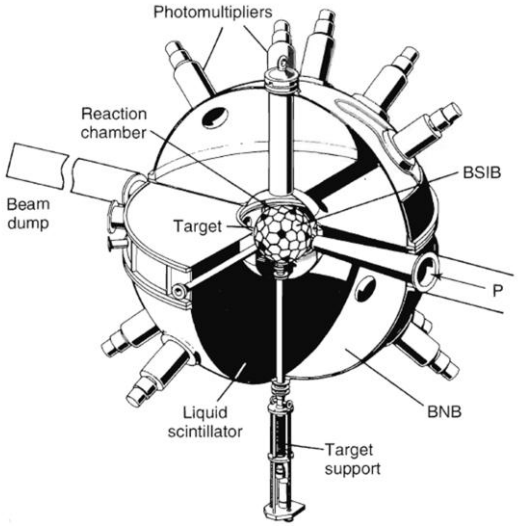
A possibility of using the NESSI detector at CCB and spallation reaction measurements with proton beam of ~ 200 MeV energy

S. Kliczewski et al.

Institute of Nuclear Physics Polish Academy of Sciences, Kraków

NESSI – NEutron Scintillator and SIlicium detector BNB – Berliner Neutron Ball,



Volume: 1.5 m^3
Diameter: 140 cm
Diameter of reaction chamber: 40 cm
Liquid scintillator: NE343 + 0.4% Gd (gadolinium)
Number of PM: 24

BSiB – Berliner Silicon Ball,
162 silicon detectors,
Acceptance: 90% from 4π
Radius: 10 cm

Single detector
Active surface: 763 mm^3
Thickness: 500 μm
Energy resolution < 100 keV

BSiB – improvement,
6 detectors in BSiB for angles between 30^o and 150^o were replaced by the telescopes consisted of two silicon detectors ΔE (80 μm and 1000 μm thicknesses, full depletion) and CsI scintillator with thickness 7 cm and photodiode readout.

In interaction of proton beam with energy much greater than 100 MeV with nuclei, besides of fusion-fission reaction, the **spallation** process becomes important. Spallation processes products can dissipate energy in evaporation of nucleons and light charged particles or by fission.

POSSIBLE EXPERIMENTS WITH PROTON BEAM OF 200 MeV ENERGY USING THE „SYRENA" EXPERIMENTAL SETUP (HIL Warszawa).

Investigation of the nucleon distribution in nuclei.

The nucleons distribution in nuclei can be deduced from experiments of elastic scattering of high energy protons on nuclei. Experiments can be performed with different targets (A = 6 – 238). The classical ΔE – E method together with scintillation NaI detectors can be used in these experiments.

Investigation of cluster structure of light nuclei.

High energy protons can produce clusters x in collisions with A nuclei. This A(p,px)Y reaction can be used for investigation of the cluster structure of light nuclei. The experiments can be inclusive with classical ΔE – E method and also correlation experiments ΔE – E with registration of px and/or xY correlations and energy spectra of the reaction products.

The experimental data should be analyzed with the CRC (Coupled Reaction Channels) method with using the spectroscopic factors of x clusters.