

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

I. STATUS REPORT FOR EXP SC 87 JUNE 1982

STUDIES OF TARGET FRAGMENTATION AT INTERMEDIATE ENERGIES  
Berkeley - Corvallis - Studsvik Collaboration

II. PROPOSAL FOR CONTINUATION OF THE PROGRAMME

STUDIES OF TARGET FRAGMENTATION AT INTERMEDIATE ENERGIES  
Berkeley<sup>1</sup> - Corvallis<sup>2</sup> - Darmstadt<sup>3</sup> - Mainz<sup>4</sup> - Studsvik<sup>5</sup>  
Collaboration

III. NEW PROPOSAL

STUDIES OF PIONIC FUSION IN NUCLEAR COLLISIONS  
Berkeley<sup>1</sup> - Corvallis<sup>2</sup> - Darmstadt<sup>3</sup> - Mainz<sup>4</sup> - Studsvik<sup>5</sup>  
Collaboration

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## Summary of Status Report and Proposals

- I. So far we have used the following heavy ion beams for experiment at SC.

85 MeV/A  $^{12}\text{C}$ : a) Target fragment mass distributions, forward momentum and average kinetic energy from the interaction with Ho, Ta, and Au. b) Target fragment angular distributions from the interaction with Au and U (in collaboration with ISOLDE) c) Target fragment differential energy distributions from the interaction with Au.

45 MeV/A  $^{12}\text{C}$  (degraded beam): Target fragment mass distributions, forward momentum and average kinetic energy from the interaction with Ho, Ta, Au, and U.

107 MeV/A  $^{16}\text{O}$ : Target fragment mass distributions, forward momentum and average kinetic energy from the interaction with Ho, Ta, Au, and U.

94 keV/A  $^{20}\text{Ne}$ : Target fragment mass distributions, forward momentum and average kinetic energy from the interaction with Au.

In the status report we only discuss results from completed data analysis.

- II. In the continuation of the program we wish to address three issues: (a) how do the mechanisms of target fragmentation change in the projectile energy region from 18-85 MeV/u, (b) can we understand the physics of why target fragmentation phenomena appear to scale with total projectile kinetic energy (or momentum) rather than projectile velocity, etc. (c) can we understand the mechanism of multi-nucleon "transfer" reactions leading to trans-target species at projectile energies greater than 25 MeV/u.
- III. Finally we propose a new radiochemical experiment at SC: "Studies of pionic fusion in nuclear collisions". We like to begin our studies with the reaction  $^{208}\text{Pb} (^3\text{He}, \pi^-)^{211}\text{At}$  with the beam energies  $85 \text{ MeV/u} \geq E_{\text{lab}} \geq 45 \text{ MeV/u}$ . The lower energies by degrading the 85 MeV/u beam.