
A NEW HIGH-GRANULARITY SILICON ARRAY FOR FUTURE REACTION STUDIES

D.Beaumel, Institut de Physique Nucléaire, Orsay, France

For the GASPARD-TRACE collaboration

New generation high granularity Silicon arrays are natively designed for optimal integration in next generation gamma detectors such as AGATA or PARIS with the aim of performing high-resolution reaction studies at present and forthcoming radioactive beam facilities. These gamma detectors, developed within European collaborations, will offer unprecedented performances in terms of resolution and efficiency. For direct reaction studies, it is established that the coupling of a Silicon array to e.g. AGATA allows a very large gain in excitation energy resolution (factor of typically 100), in comparison with the case where the excitation energy is deduced from the recoil charged-particle measurement. This is of particular interest considering the present global trend of increased beam masses towards e.g. fission fragments. As a new feature, the device will offer unprecedented light particle identification capabilities through implementation of pulse shape discrimination technique. The CHYMENE target device is an essential instrument to be integrated in the new array. This system, based on continuous extrusion of an hydrogen film through an extruder nozzle is now being commissioned.

The GASPARD[1] and TRACE[2] collaborations are now converging to build such a new-generation 4π Si array in common, with a timeline of 2019-20 for completion in view of experiments at SPIRAL1&2, SPES or HIE-Isolde and possibly at low-energy branches of in-flight facilities. A status of the project will be presented. In terms of physics, a broad domain of applications can be envisaged, ranging from shell structure evolution, pairing studies, clustering, to simulations of reactions of astrophysical interest.

REFERENCES

- [1] D.Beaumel, for the GASPARD collaboration, *Nucl. Instrum. Meth. in Phys. Res. B* 317, 661 (2013)
[2] Tracking Array for Light Charged Particle Ejectiles. <https://web.infn.it/spes/index.php/research-on-nuclear-physics/150-trace>