

Range of plasma ions in cold cluster gases near the critical point

G. Zhang,^{1*} H.J. Quevedo,² A. Bonasera,^{1,3} M. Donovan,² G. Dyer,² E. Gaul,² G.L. Guardo,³
M. Gulino,^{3,4} M. La Cognata,³ D. Lattuada,³ S. Palmerini,^{5,6} R.G. Pizzone,³ S. Romano,³
H. Smith,² O. Trippella,^{5,6} A. Anzalone,³ C. Spitaleri,³ and T. Ditmire²

¹*Cyclotron Institute, Texas A&M University, College Station, Texas*

²*Center for High Energy Density Science, C1510, University of Texas at Austin, Austin, Texas*

³*Laboratori Nazionali del Sud-INFN, via S. Sofia 64, 95123 Catania, Italy*

⁴*Libera Università' Kore, 94100 Enna, Italy*

⁵*Department of Physics and Geology, University of Perugia, Via A. Pascoli, 06123 Perugia, Italy*

⁶*Istituto Nazionale di Fisica Nucleare, Section of Perugia, Via A. Pascoli, 06123 Perugia, Italy*

We measured the range of plasma ions in cold cluster gases by using the Petawatt laser at the University of Texas-Austin. The produced plasma propagated in all directions some hitting the cold cluster gas not illuminated by the laser. From the ratio of the measured ion distributions at different angles we can estimate the range of the ions in the cold cluster gas. It is much smaller than estimated using popular models, which take only into account the slowing down of charged particles in uniform matter. We discuss the ion range in systems prepared near a liquid-gas phase transition.

[1] G. Zheng *et al.*, Phys. Lett. A **381**, 1682 (2017).

* On leave from SINAP, Shanghai, China.