

Abstract Submitted  
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**Mechanism of bullet-to-streamer transition in water surface incident helium atmospheric pressure plasma jet (APPJ)<sup>1</sup>** SUNG-YOUNG YOON, Natl Fusion Res Inst, GON-HO KIM, Seoul National University, SU-JEONG KIM, Hanwha chemical cooperation, BYEONGJUN BAE, Seoul National University, SEONG BONG KIM, SEUNGMIN RYU, SUK JAE YOO, Natl Fusion Res Inst — The mechanism of bullet to streamer transition of helium-APPJ bullet on the electrolyte surface was investigated. The APPJ was discharged in pin-to-ring DBD reactor system with helium gas by applying the ac-driven voltage at a frequency of 10 kHz. The water evaporation was controlled via saline temperature. The temporal- and 2-dimensional spatially- resolved plasma properties are monitored by optical diagnostics. During the APPJ bullet propagation from reactor to electrolyte surface, the transition of bullet from streamer was recognized from the high speed image, hydrogen beta emission line, and bullet propagation speed. The He metastable species density profiles from the tunable diode laser absorption spectroscopy (TDLAS) showed the metastable lost the energy near electrolyte surface. It is found that the bullet transitioned to streamer when the water fraction reached to ~29%. This can be fascinating result to study the plasma physics liquid surface, non-fixed boundary.

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