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Dynamics of atmospheric pressure plasma bullets in He-Ar mixtures JULIEN JARRIGE, ERDINC KARAKAS, MOUNIR LAROUSSI, Laser and Plasma Engineering Institute, Old Dominion University — Atmospheric pressure non-thermal plasma jets in ambient air have received great attention for their potential in biomedical applications. Several studies have shown that NTP jets are not continuous, but composed of plasma bullets traveling at high velocities. In this work, we present an experimental study of plasma bullets produced in Ar-He mixtures. The plasma jet is initiated in a DBD capillary reactor driven by microseconds high voltage pulses. The effects of argon content on the discharge characteristics, on the bullet propagation, and on the radiative properties of the jet are investigated using electrical measurements, fast ICCD camera imaging, and time-resolved optical emission spectroscopy. It is shown that the propagation velocity of plasma bullets in open air increases with argon content. The addition of a few percent of Ar in the feed gas leads to a significant increase of the emission intensity of N_2 (C-B) and of highly reactive OH radicals, while N_2^+ (B-X) bands and He lines almost disappear from the emission spectra. The role of He and Ar metastables in the plasma kinetics is discussed.

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