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The role of molecular air species in kHz driven atmospheric pressure plasma jets QAIS TH. ALGWARI, Centre for Plasma Physics, School of Mathematics and Physics, Queens University Belfast, Northern Ireland, UK, DEBORAH O'CONNELL, York Plasma Institute, Department of Physics, University of York, York YO10 5DD, UK — Non-thermal plasmas operated at ambient pressure and temperature are of particular technological interest. Mixing of ambient air with the plasma channel and its influence on the plasma sustainment and propagation mechanisms, and reactive species production is very important for controlling and delivering the plasma for applications. The excitation dynamics within the main plasma production region and the resulting plasma jets of a kHz atmospheric pressure dielectric barrier discharge (DBD) jet was investigated. The plasma is created within a quartz tube surrounded by two electrode rings and is operated in helium with nitrogen admixtures. The emission is measured phase, space and spectrally resolved. The plasma ignites as a streamer-type discharge and propagates in the gas channel into ambient air. The influence of varying nitrogen admixtures to the spatio-temporal dynamics of the guided streamer is presented. Interaction of the plasma jet channel with ambient air is investigated through interacting two gas flows; as the mixing of molecular air impurities changes along the channel, the plasma profile is observed to change accordingly influencing the plasma propagation and structure.

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