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Ellipticity dependence of frustrated tunneling ionization in argon atoms.[1] KATHRYN HAMILTON, THOMAS PAULY, KLAUS BARTSCHAT, Drake University — Following tunneling ionization by a strong, few-cycle infrared pulse, a portion of the ionized electrons can recombine into a bound state through Frustrated Tunneling Ionization (FTI) [1,2]. A recent joint experimental and theoretical study on argon atoms, with emphasis on metastable production by linearly polarized light, was reported by Chetty et al. [3]. By increasing the ellipticity of the driving laser pulse, the liberated electron is driven further away from the ion, thereby reducing the probability of recombination into a bound state. The ellipticity dependence of FTI was previously studied both theoretically [1] and experimentally [4] in helium. Here we present predictions for the theoretically more challenging argon target, employing both multi-electron [4] and single-active electron [5] theoretical techniques to compliment experimental efforts currently in progress [7]. [1] T. Nubbemeyer et al., Phys. Rev. Lett. **101** (2008) 233001. [2] H. Zimmermann et al., Phys. Rev. Lett. **118** (2017) 013003. [3] D. Chetty et al., arXiv:1912.06280v1 (2019). [4] H. Yun et al., Nat. Phot. **12** (2018) 620-624. [5] A. C. Brown et al., Comput. Phys. (2019) 107062. [6] N. Douguet et al., Phys. Rev. A **93** (2016) 033402. [7] I. Litvinyuk, priv. commun. (2020).

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