

Squeezing of Dark Matter

M KOPP¹, V FRAGKOS¹, AND I PIKOVSKI^{1,2}

¹*Department of Physics, Stockholm University, Stockholm, Sweden*

²*Department of Physics, Stevens Institute of Technology, Hoboken, USA*

Contact Email: igor.pikovski@fysik.su.se

Axion-like particles are promising dark matter candidates. A classical field description is typically employed, motivated by large phase space occupation numbers. Here we show that such a description is accompanied by a quantum effect that is well known in laser physics and cold atoms: squeezing due to self-interactions. We show that the onset of squeezing is reached on microsecond-scales, thus suggesting that dark matter might be in a quantum state on various scales. Conversely, our results highlight the incompleteness and limitations of the typically employed classical single field description of light dark matter candidates.