Abstract Submitted for the DFD19 Meeting of The American Physical Society

Particle monolayer growth in evaporating salty colloidal droplets<sup>1</sup> MYRTHE BRUNING, LAURA LOEFFEN, ALVARO MARIN, University of Twente — When pinned colloidal sessile droplets evaporate, the well-known coffee stain effect will occur: particles accumulate along the contact line and form a ring. However, when small amounts of salt are added to the droplet, interesting phenomena occur that alter the particle agglomeration process drastically. As a consequence of the inhomogeneous evaporation along the droplet interface, salt accumulates at the contact line. Since salt increases the surface tension, an interfacial Marangoni flow is generated. This surface flow is directed from the apex of the droplet towards the contact line. It overcomes the bulk capillary flow, resulting in a reversed flow direction as compared to the classical coffee-stain case. Interestingly, despite the flow reversal, particles still accumulate at the contact line. However, in this case particles arrive at the contact line along the liquid-gas interface of the droplet and form a monolayer there. The structure of this particle layer is studied in detail using laser scanning confocal microscopy, which allows us to access the full 3D-position of all particles at the interface and gain insight into their distribution. In this work we will study the dramatical effect that the salt concentration has on the particle layer structure.

<sup>1</sup>ERC-StG 678573 Nanopacks

Myrthe Bruning University of Twente

Date submitted: 30 Jul 2019

Electronic form version 1.4