

Abstract Submitted  
for the DPP11 Meeting of  
The American Physical Society

**Alignment of dust particles in subsonic flows** ALEXANDER PIEL,  
IEAP, Christian-Albrechts-University, D-24098 Kiel — The role of ion drag forces  
for the alignment of dust particles is studied for subsonic flows. While alignment by  
wake-field attraction is a well known mechanism for supersonic flows, it is argued here  
that ion-scattering forces become more important in subsonic ion flows. A model  
of non-overlapping collisions is introduced and numerical results are discussed. For  
typical conditions of dusty plasma experiments, alignment by drag forces is found  
strong enough to overcome the destabilizing force from Coulomb repulsion between  
dust particles. It turns out that the major contribution to the horizontal restoring  
force originates from the transverse momentum transfer, which is usually neglected  
in ion drag force calculations because of an assumed rotational symmetry of the  
flow.

Alexander Piel  
IEAP, Christian-Albrechts-University, D-24098 Kiel, Germany

Date submitted: 10 Jul 2011

Electronic form version 1.4