

# Biancalani et al, "Gyrokin. nonlinear Alfvén modes and energ. ions."

- GK PIC codes ORB5 and EUTERPE offer now the capability of investigating selfconsistently **nonlinear Alfvén** mode dynamics
- Bulk ions, electrons and energ. ions treated fully **gyrokinetically**
- Radial shrinking observed during early NL phase of TAE (ITPA case)
- **Zonal structures** (GAMs and ZFs) **force-driven** by Alfvén mode (electron compressibility and kin. electron effects must be retained)
- Strong possible implications for modification of turbulent transport
- No EP redistribution found when AE saturates due to coupling to zonal struct (two-modes only here, for ITPA case with flat q-prof)
- Next step 1: **global modes and EP in realistic equil. and profiles**
- Next step 2: **global modes with energetic particles and turbulence**