

# TMCI SCALING FACTOR WITH ENERGY FOR THE SPS

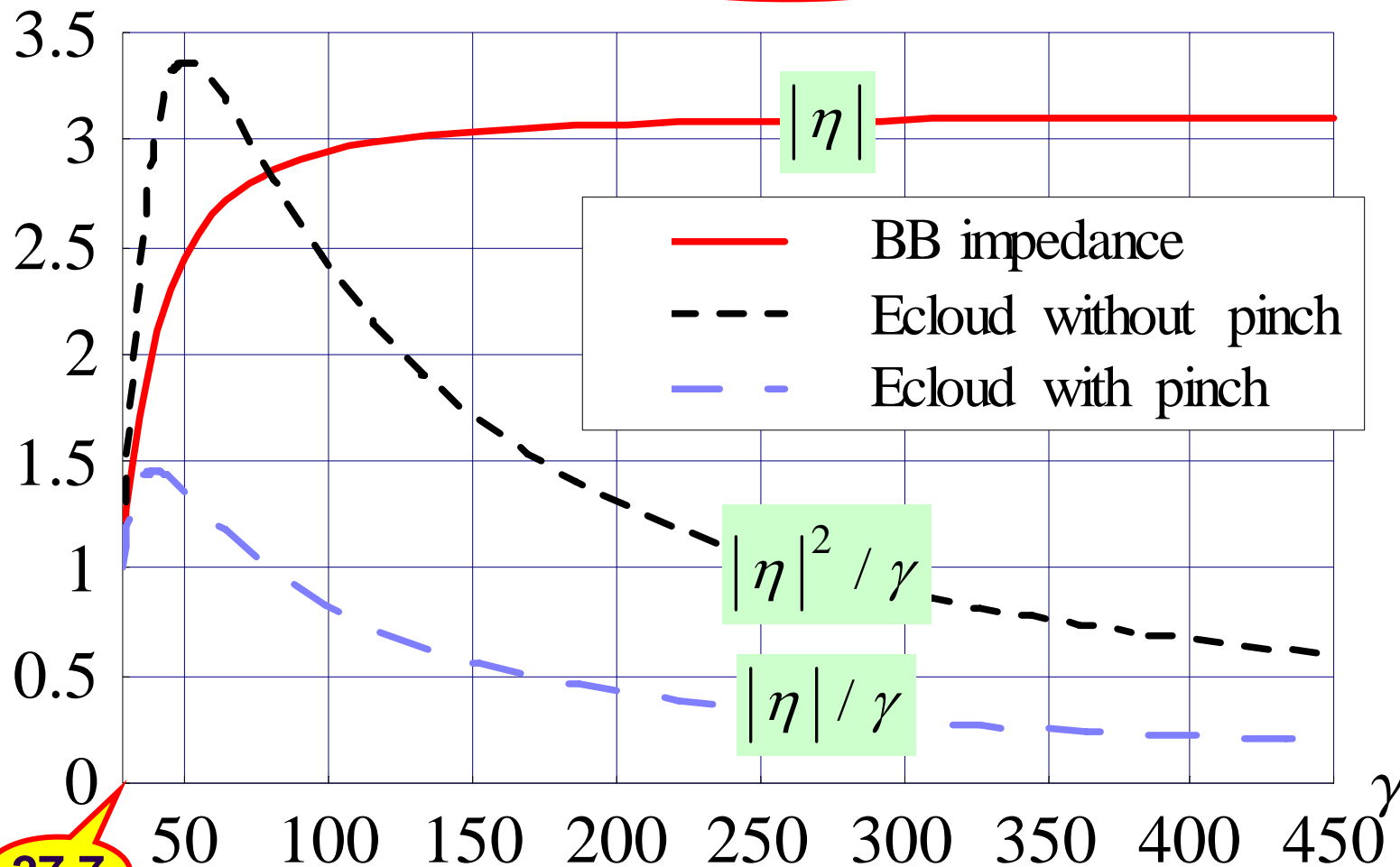
Elias Métral and Giovanni Rumolo

- ◆ **TMCI from a BB impedance** ⇒ See also RLC meeting of 11/11/05
- ◆ **TMCI from Ecloud**
  - Without pinch enhancement ⇒ See Ecloud'02 paper
  - With pinch enhancement ⇒ From FZ's talk at GSI2006 workshop (<http://care-hhh.web.cern.ch/care-hhh/Collective%20Effects-GSI-March-2006/default.html>)

# FROM ANALYTICAL ESTIMATES

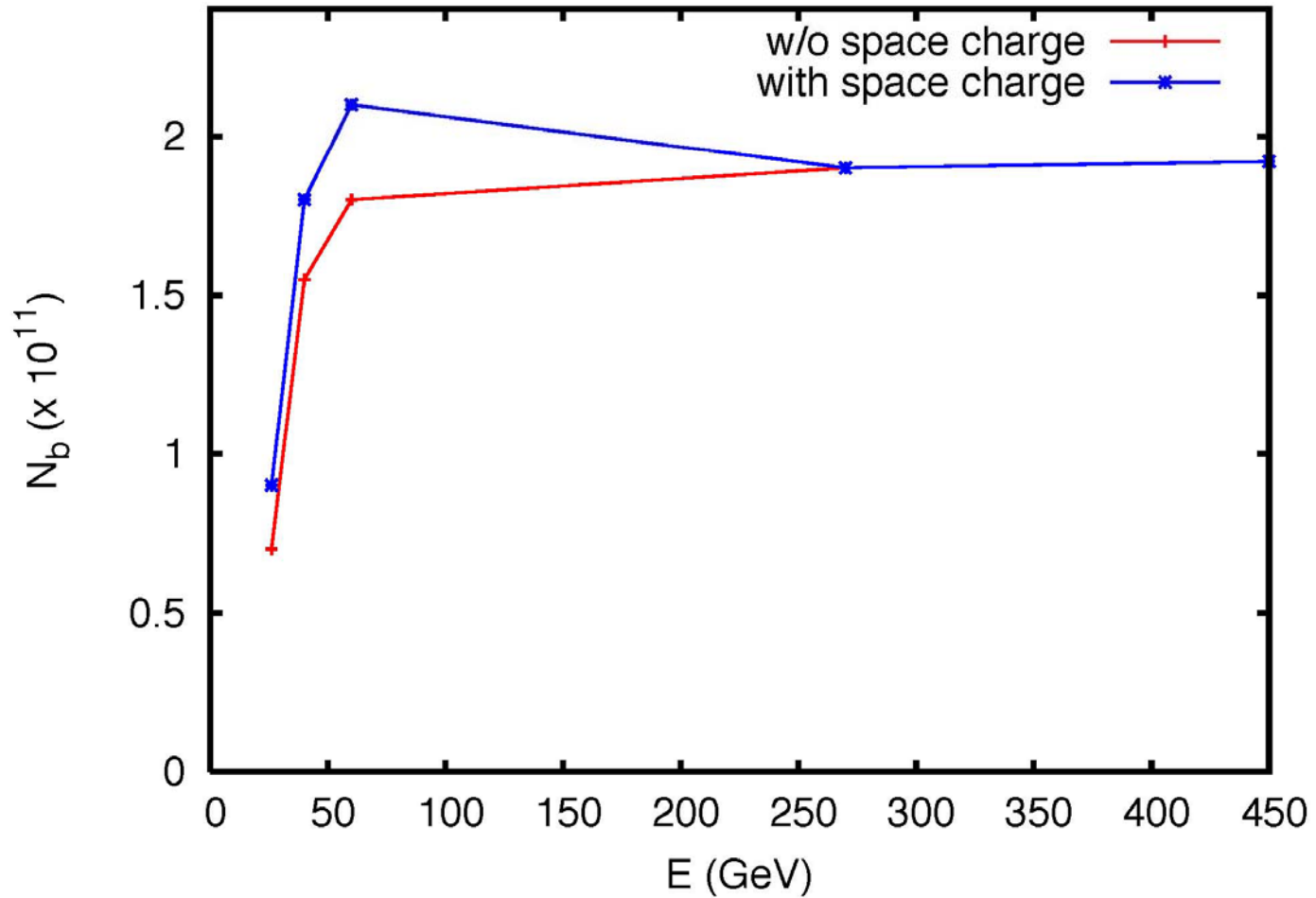
Scaling factors

Normalized to the value at  $\gamma = 27.7$



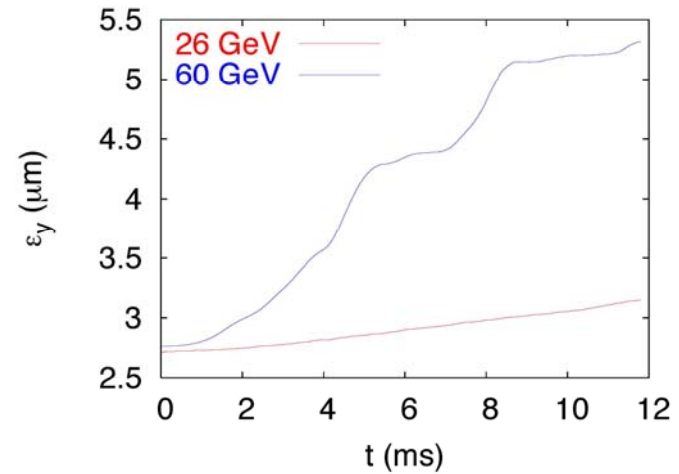
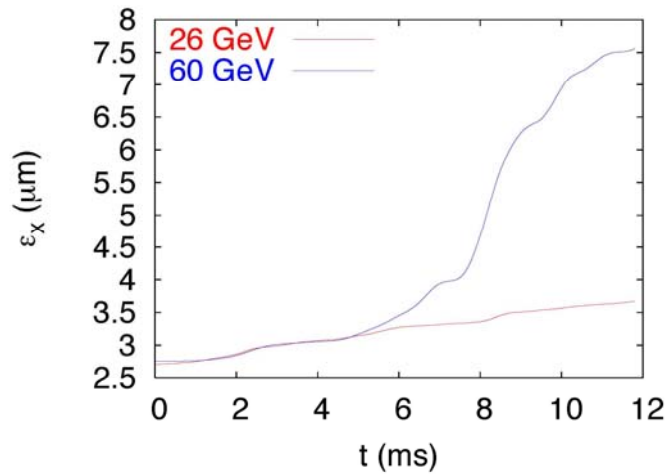
27.7

# FROM HEADTAIL SIMULATIONS: BB IMPEDANCE

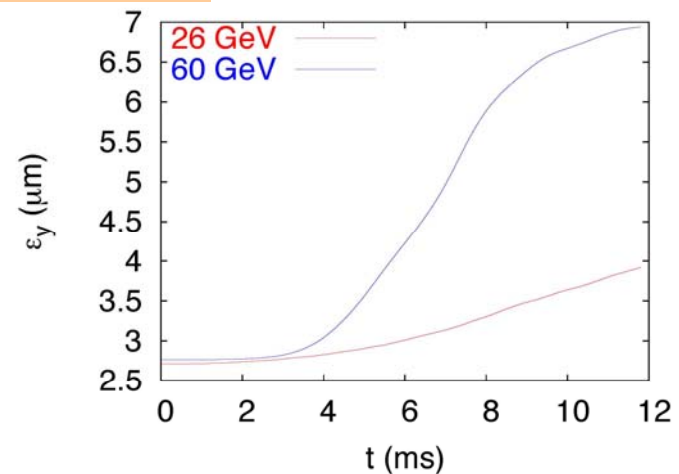
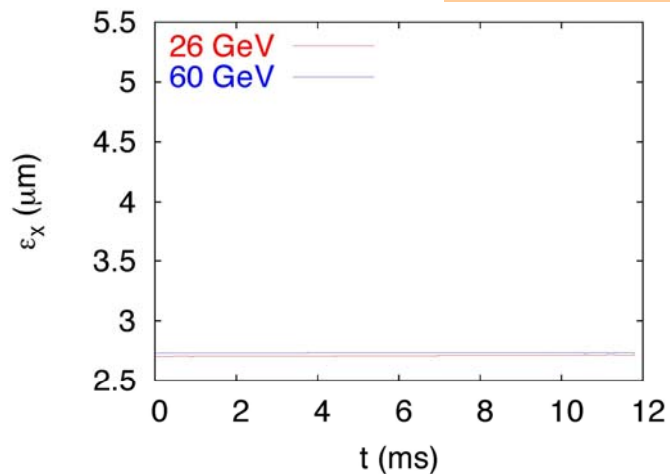


# FROM HEADTAIL SIMULATIONS: ECLOUD

## FIELD-FREE REGION



## DIPOLE REGION



# CONCLUSION

- ◆ Good agreement between analytical estimates and HEADTAIL simulations for a BB impedance
  - ◆ For the Ecloud TMCI-like instability
    - Analytical estimates predict first a slight increase of the instability threshold with energy until  $\gamma \approx 40$  (with the pinch enhancement) and then a decrease
    - HEADTAIL simulations reveal that the intensity threshold when  $\gamma \sim 60$  is lower than when  $\gamma = 27.7$  (where the analytical estimates would have predicted a slightly higher threshold)
- ⇒ More detailed HEADTAIL simulations will be performed