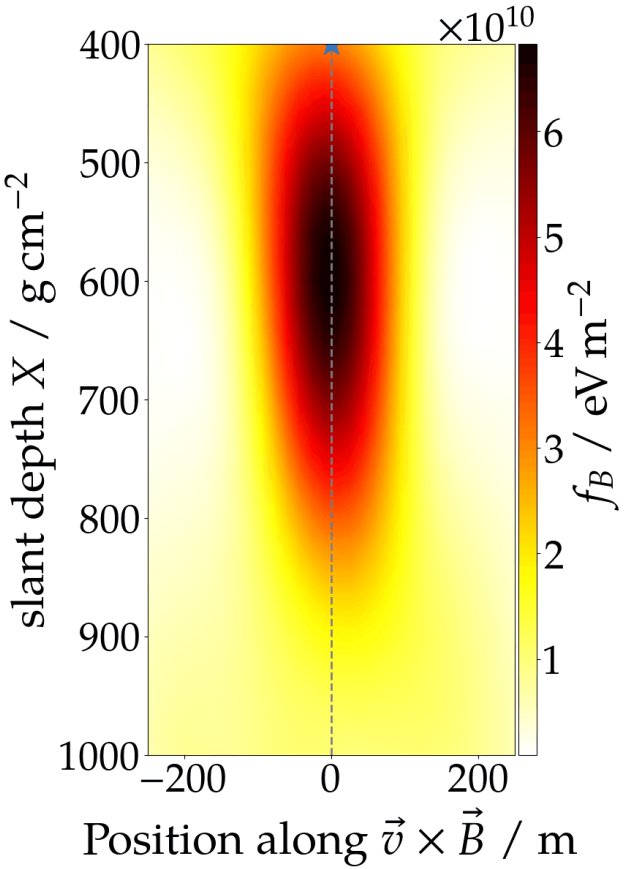
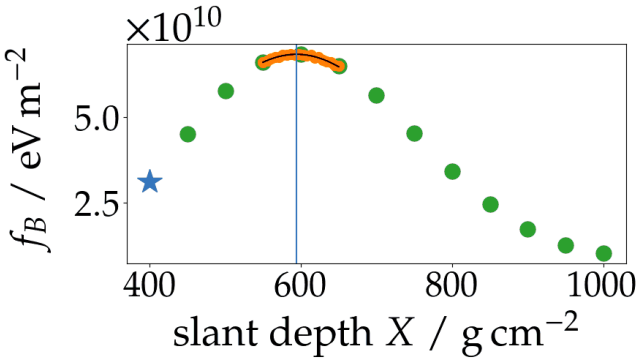
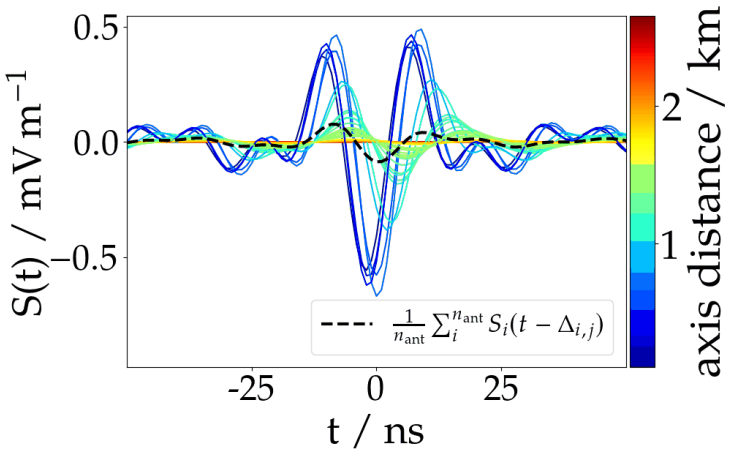
Expected performance of interferometric air-shower measurements with radio antennas

Felix Schlüter, Tim Huege

PoS (ICRC21) 228







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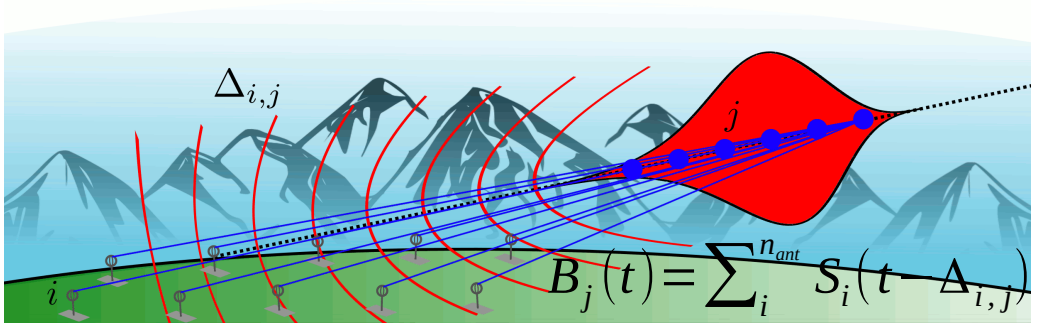
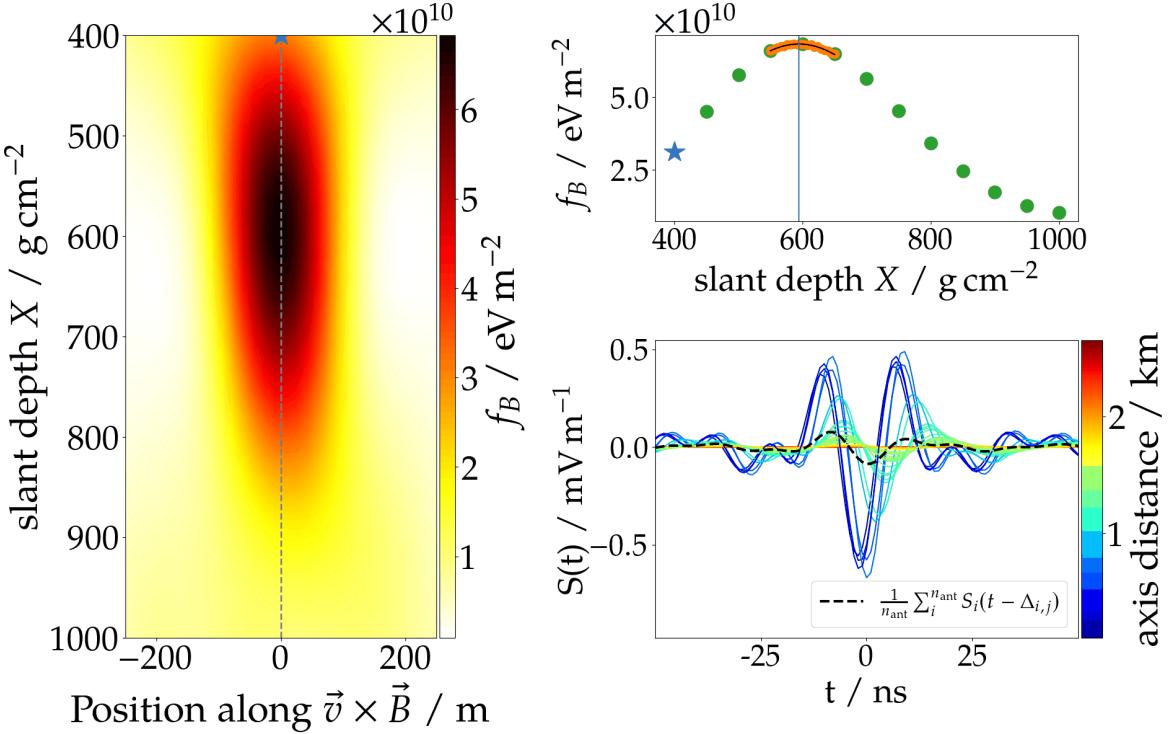
Radio-interferometric-technique (RIT)

- Proposed by H. Schoorlemmer and W. R. Carvalho Jr. (arXiv:2006.10348)

- Demonstrated excellent performance in reconstructing X_{max} with idealized detector:
  $\sigma_{Xmax} < 5$ g/cm^2 (for inclined showers)

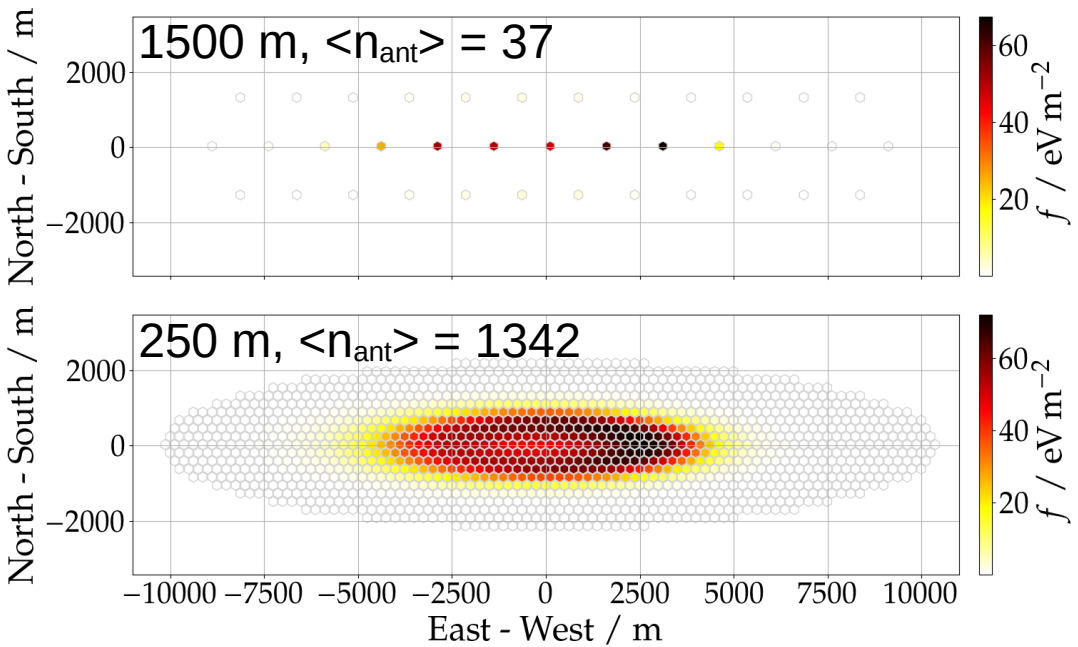
- Here: Evaluate performance under more realistic conditions



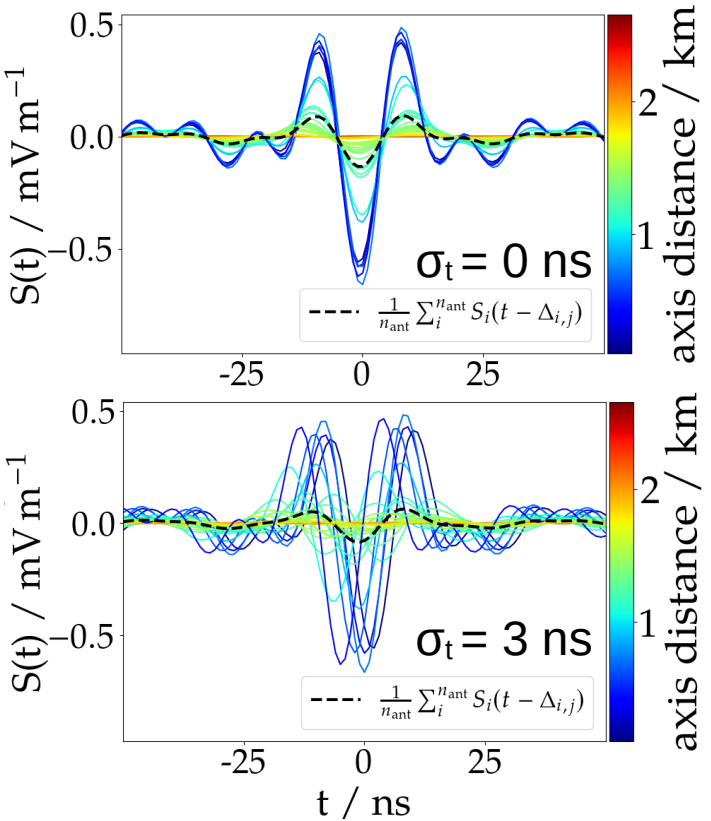


Performance with realistic detector

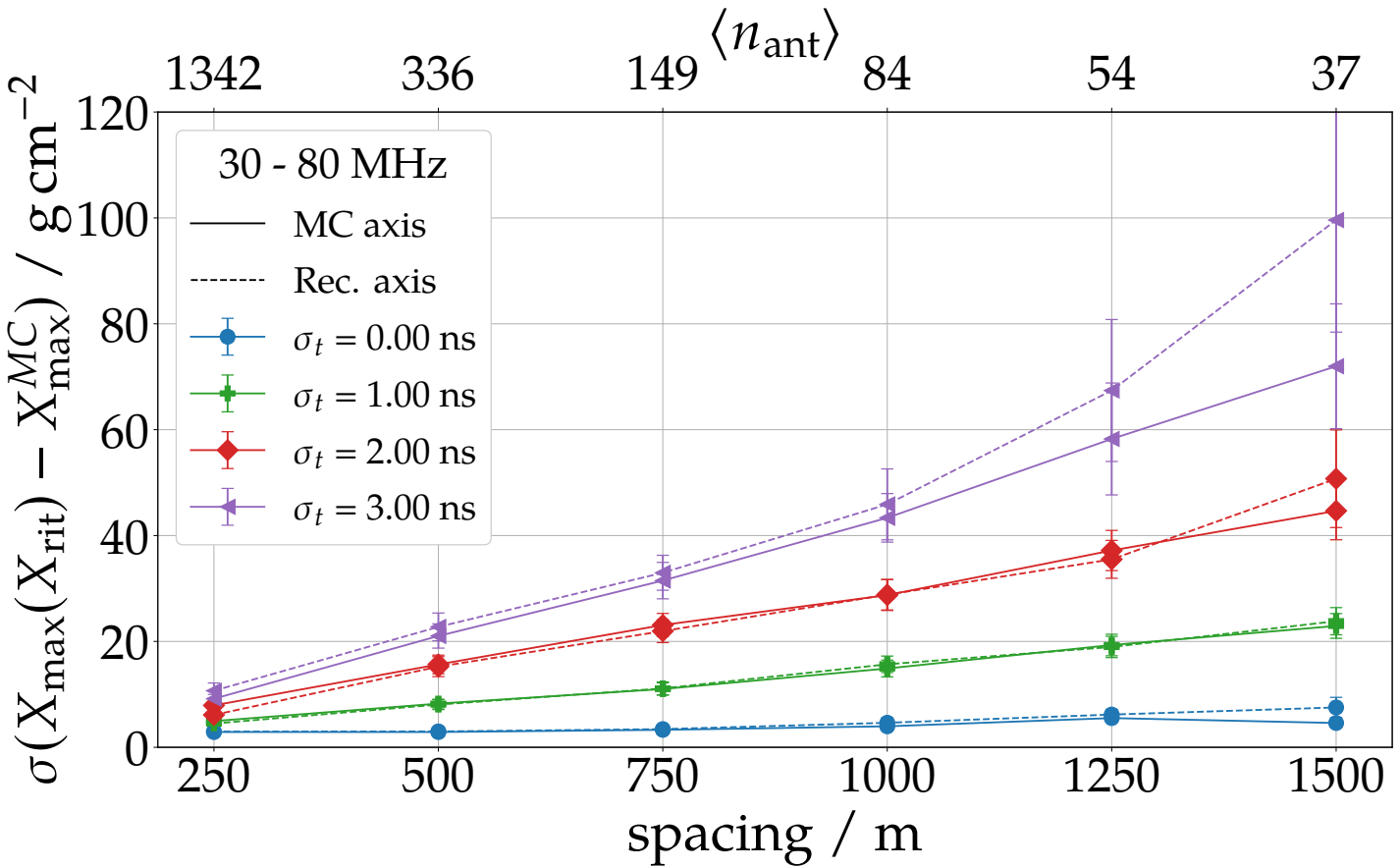
Hexagonal antenna arrays of **various** fixed spacing / **antenna multiplicity n_{ant}**



Smearing signal timing with σ_t to mimic **imperfect time synchronasation**



Performance with realistic detector



- Very good resolution with (unrealistic) $\sigma_t = 0$
- For larger σ_t, resolution degenerates more when low n_{ant} available
- σ_{Xmax} (σ_t =1ns, n_{ant}~54) ≤ 20 g/cm^2

Investigation with higher frequencies & more:
F. Schlüter and T. Huege, arXiv:2102.13577v1 (press. in JINST)

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