

Status Update about the PolariX TDS Project. + Precision X-band RF control system.

Matter & Technologies
ARD-ST3 Annual Meeting

Matthias Reukauff
Darmstadt, Oct. 16, 2019

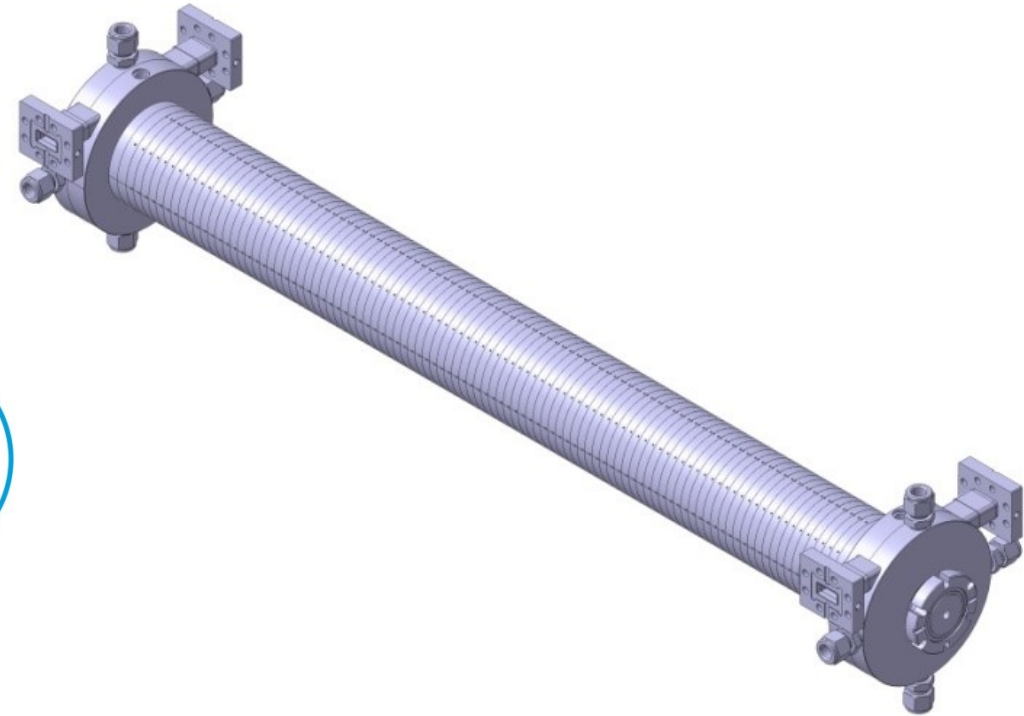
PolariX TDS: A Huge Collaboration

- **PolariX TDS:** Polarizable X-band Transverse Deflecting Structure

RF field is polarizable

TDS: beam diagnostic tool

Resonance frequency in X-band (12 GHz)



- Collaboration between:



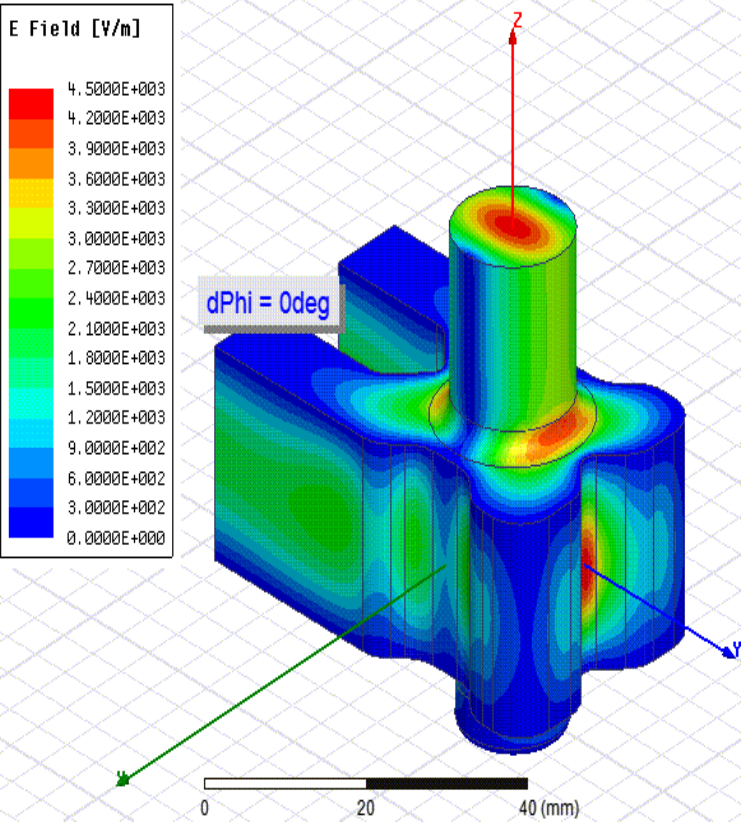
PAUL SCHERRER INSTITUT



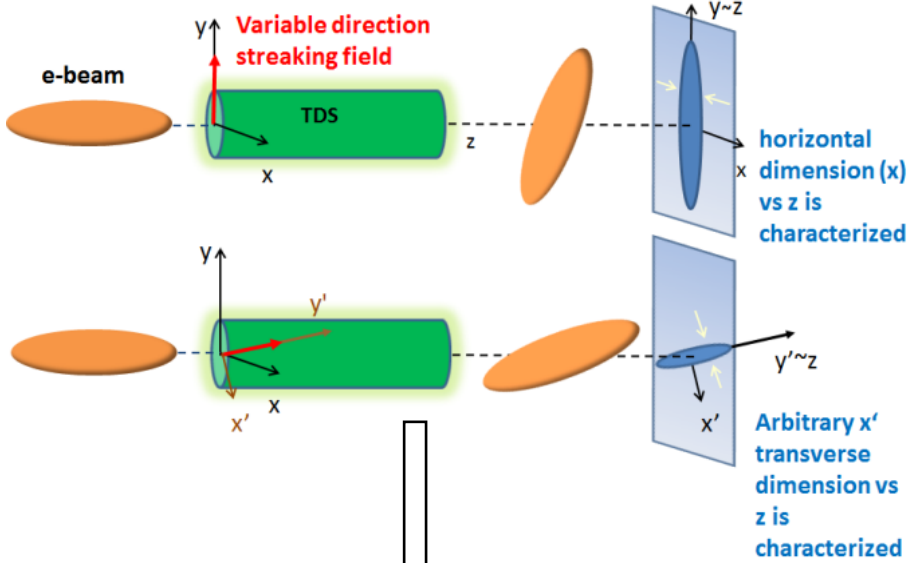
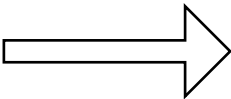
HELMHOLTZ

RESEARCH FOR GRAND CHALLENGES

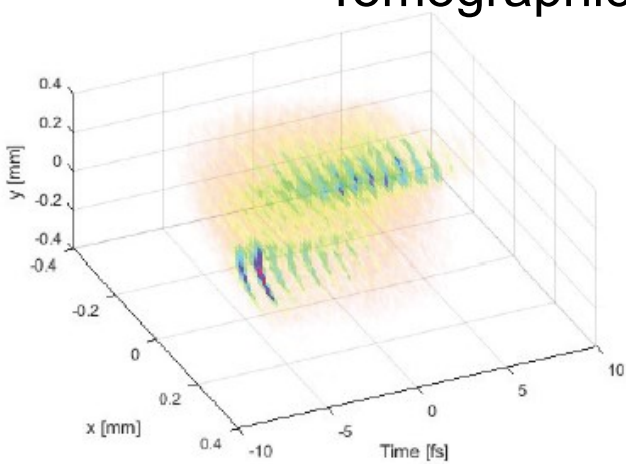
Polarizable RF Field?



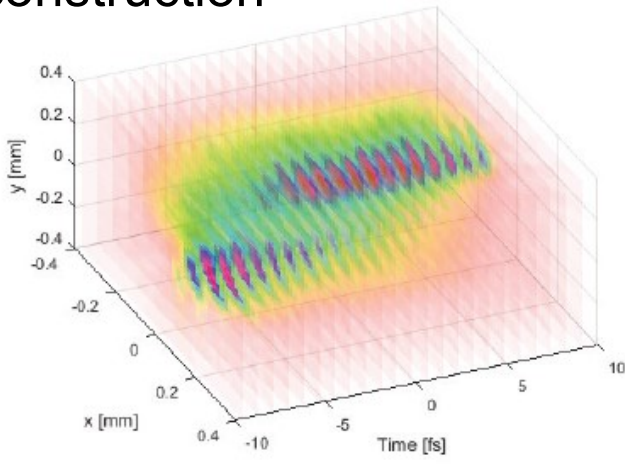
Variable Polarization Circular
TE11 Mode Launcher
A. Grudiev, CLIC-note-1067 (2016)



Tomographic reconstruction



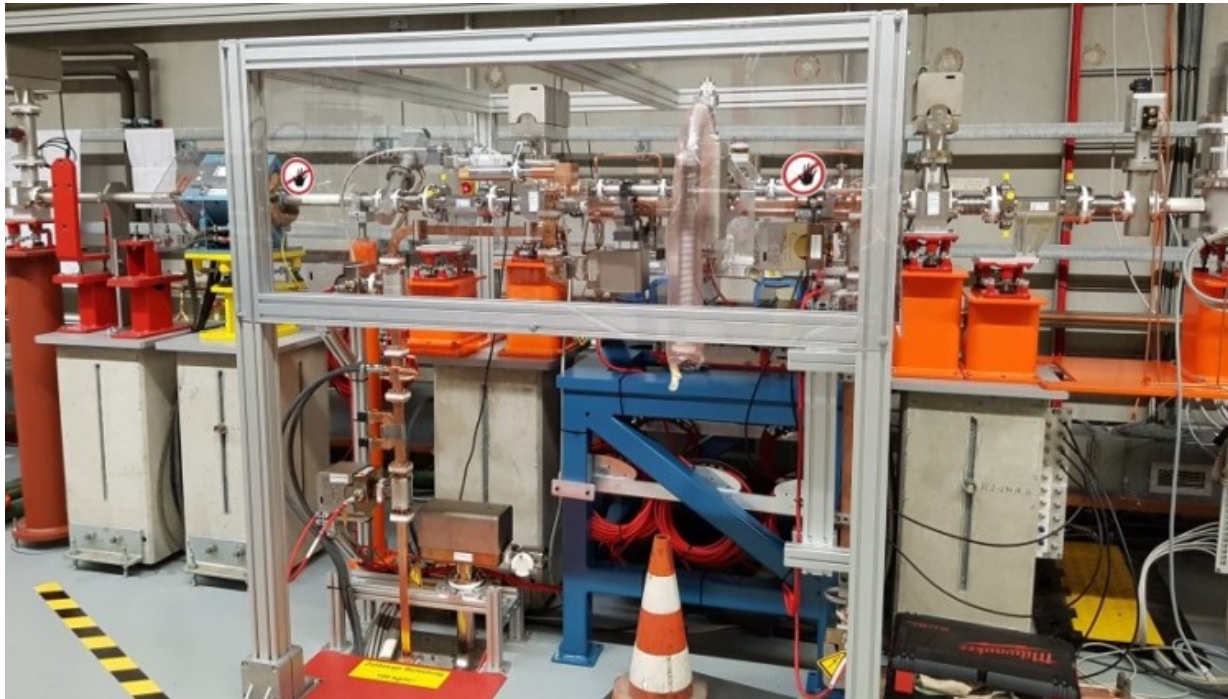
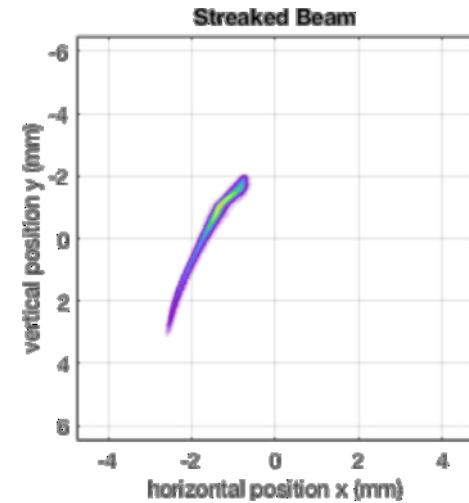
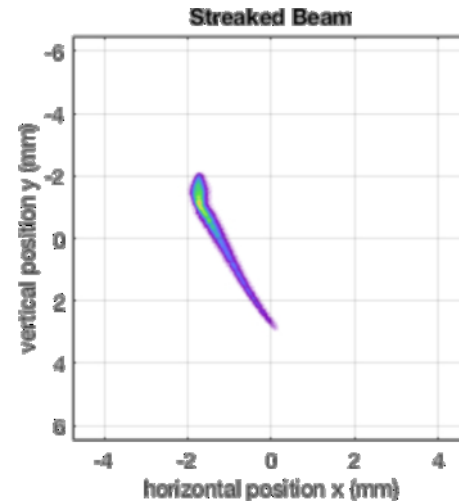
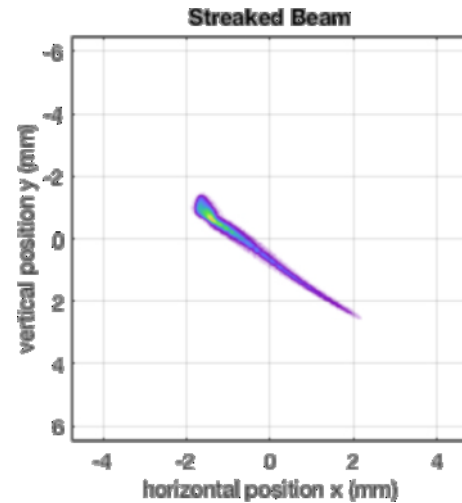
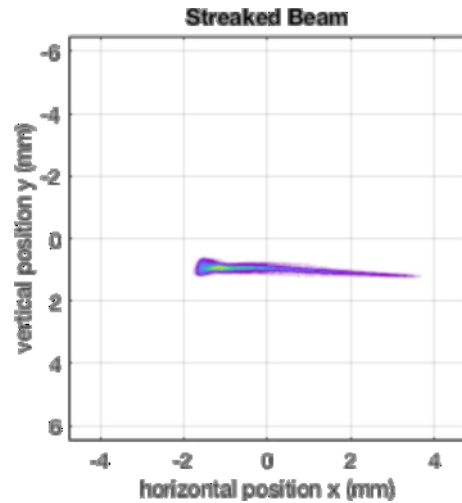
Real beam at the screen (TDS off)



Reconstructed beam at the screen

D. Marx et al 2017 J. Phys.: Conf. Ser. 874 012077

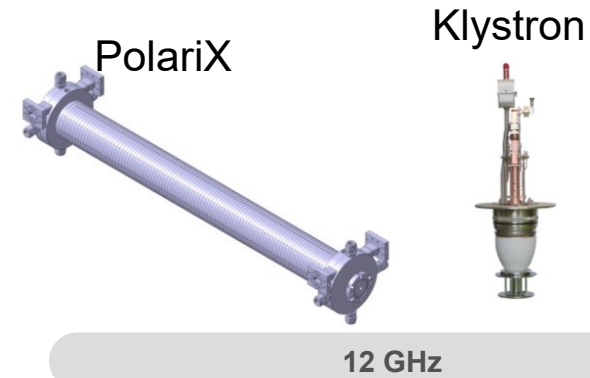
It's Already Running!



- First streaking on 5th September 2019
- Variable streaking proven on 9th September

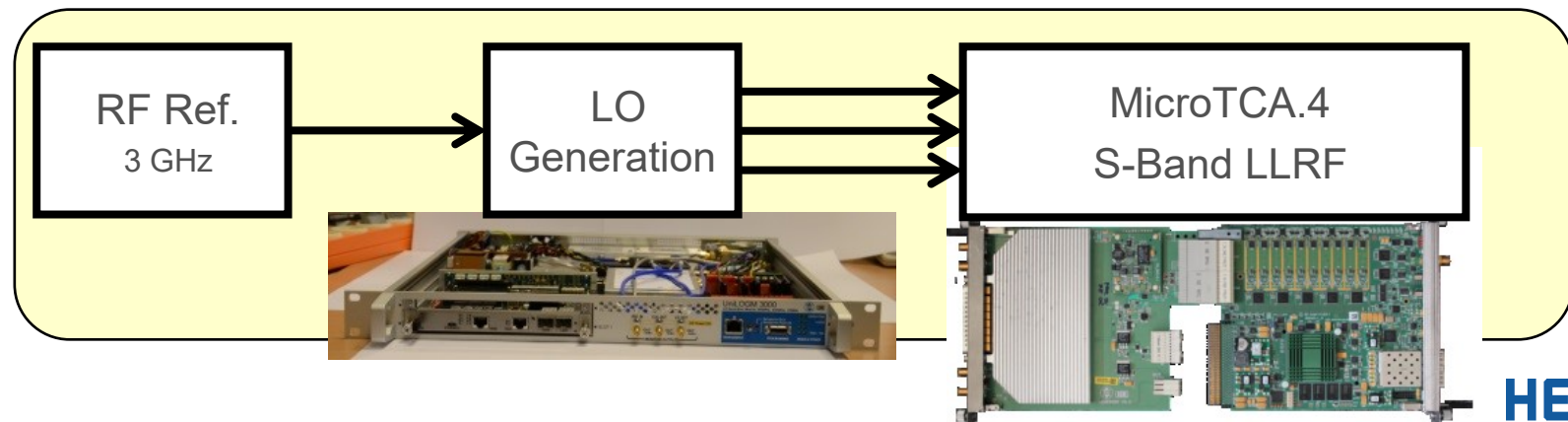
How To Control The Cavity?

- Resonance frequency: 12 GHz
- → **New RF frontend required**
- Idea: Reuse existing 3 GHz LLRF system



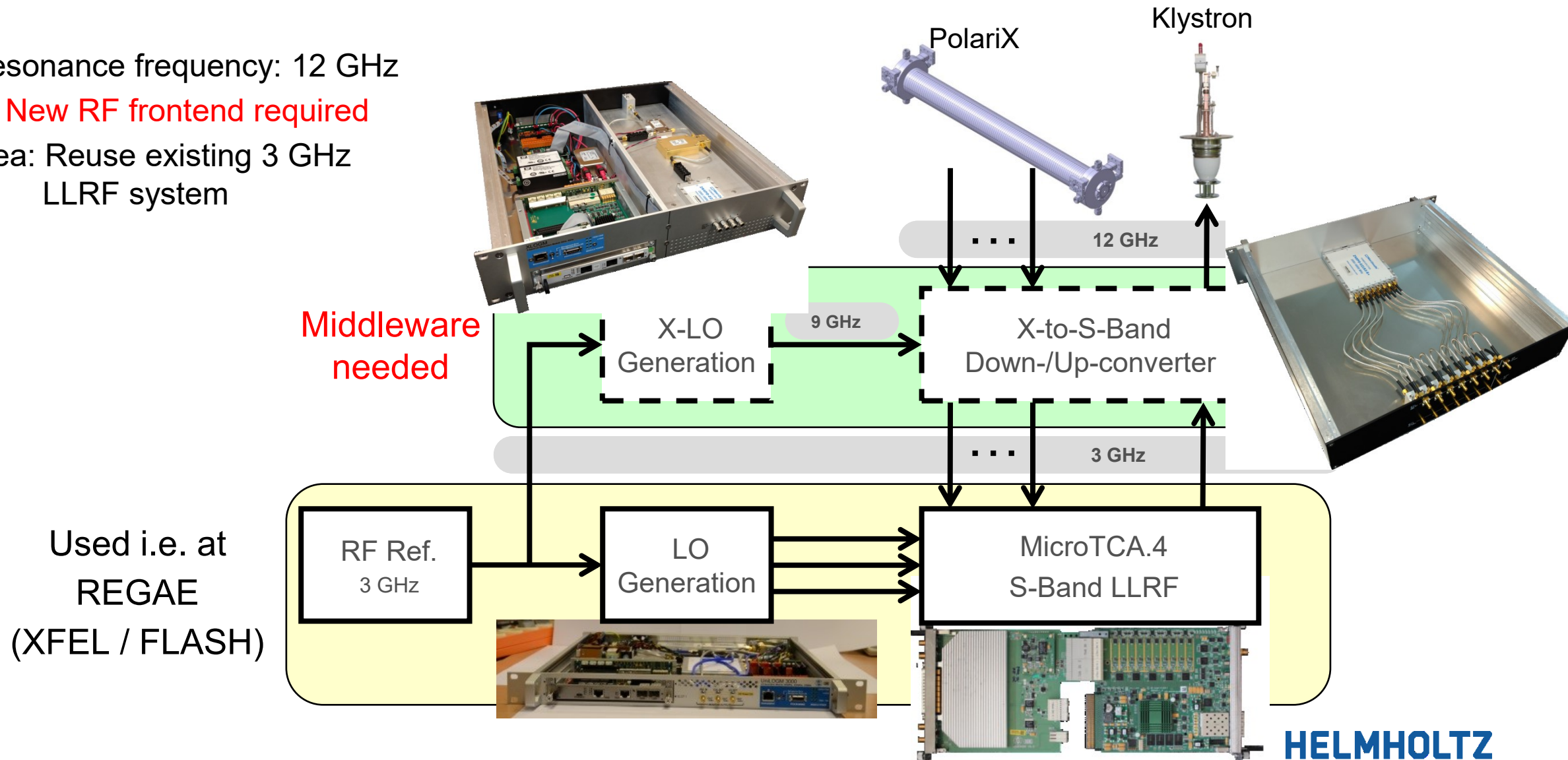
Middleware
needed

Used i.e. at
REGAE
(XFEL / FLASH)

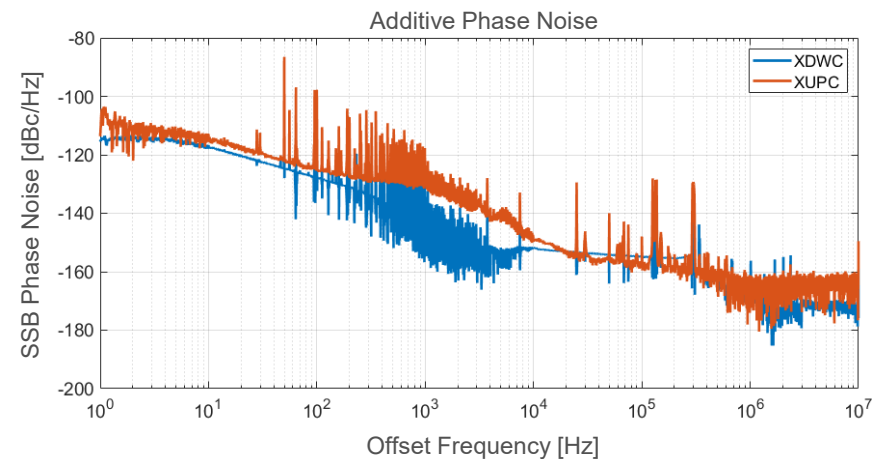
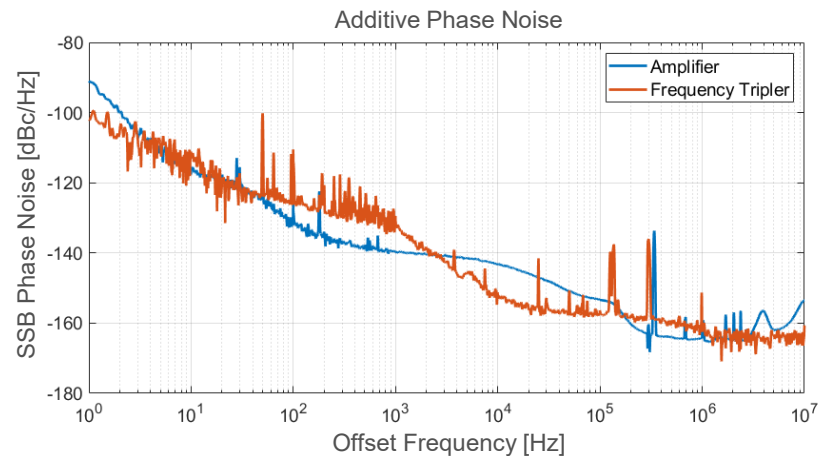


How To Control The Cavity?

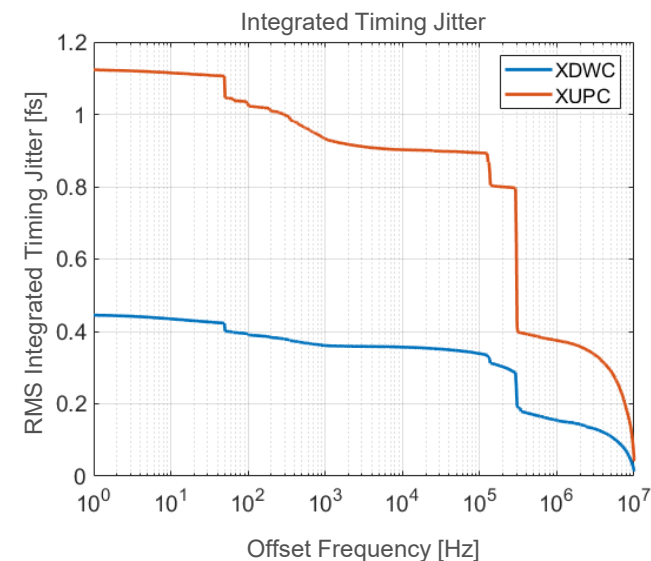
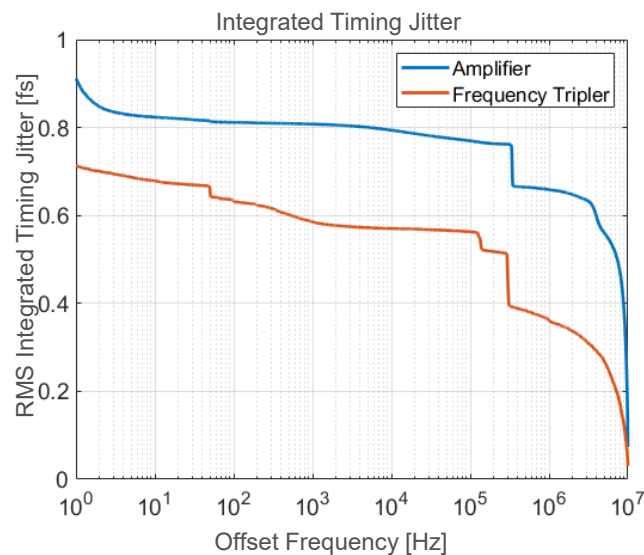
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What We Achieve...



Only about 2 fs rms
additive phase noise!



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Thank you

Contact

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