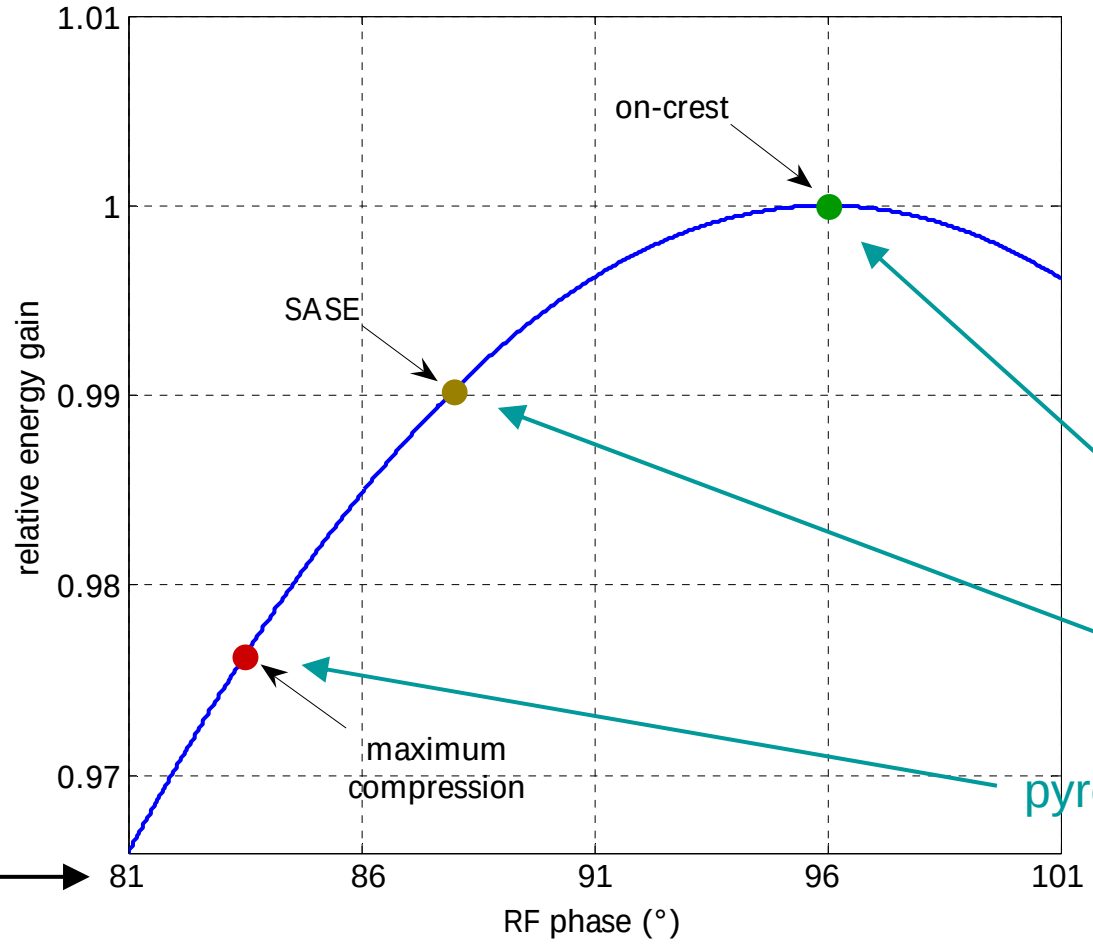
Proposal for a Phase Information Server

A DOOCS server containing

- measured **on-crest phase** setpoints
- good **SASE phase** setpoints
- other useful information?

P. Castro, L. Fröhlich, B. Polzin

The Problem



RF phase setpoints have arbitrary origin →

Measurements:

OTR screens/ phase monitors

MCP/GMD

pyroelectric detectors

DOOCS Properties

TTF2.RF/PHASE_INFO/ACC1/

Property	Type	Description
ON_CREST_PHASE.SP	float	Last measured on-crest phase SP
ON_CREST_PHASE.TIME	integer	Unix time of the last change
ON_CREST_PHASE.DESC	string	Comment for the last measurement
ON_CREST_PHASE.MON	integer	0-unknown, 1-OTR screen, 2-old phase monitors, ...
SASE_PHASE.SP	float	Last phase setpoint with SASE
SASE_PHASE.TIME	integer	Unix time of last change
SASE_PHASE.MON	integer	0-unknown, 1-GMD-T, 2-GMD-B

manual measurements

automatic logging every 5 min

P. Castro, L. Fröhlich, B. Polzin

Pros+Cons

Pro

- Automatic adjustment of beam loading compensation
- Multi-knob for energy-neutral phase adjustment
- Online display for operators
- Histories of important phases available

Contra

- Periodic measurements needed (every morning shift?)

RF Information DOOCS Server

Suggested DOOCS address: TTF2.RF/RF_INFO/{GUN,ACC1,ACC2,…}/

Property	Type	Description
ON_CREST.PHASE_SP	float (rw)	Last measured on-crest phase setpoint of the module
ON_CREST.AMPLITUDE_SP	float (ro)	Amplitude setpoint at the end of the measurement (*automatic,* i.e. automatically read by the server when ON_CREST.PHASE_SP is changed)
ON_CREST.PHASE_RBV	float (ro)	Readback value of the vectorsum phase *(automatic)*
ON_CREST.AMPLITUDE_RBV	float (ro)	Readback value of the vectorsum amplitude *(automatic)*
ON_CREST.TIME	integer (ro)	Unix timestamp *(automatic)*
ON_CREST.COMMENT	string (rw)	Comment for the last on-crest phase measurement (e.g. “pyro scan, phase of maximum compression plus 12.5 deg”)
ON_CREST.MONITOR	integer (rw)	Code for the type of the last on-crest phase measurement: 0 – unknown 1 – OTR screen 2 – Kollewe-type phase monitors 3 – Löhl-type phase monitors 4 – pyroelectric detectors 5 – synchrotron light monitor 6 – BPM
SASE.PHASE_SP	float (ro)	Last phase setpoint of the module under SASE conditions
SASE.AMPLITUDE_SP	float (ro)	Amplitude setpoint
SASE.PHASE_RBV	float (ro)	Readback value of the vectorsum phase
SASE.AMPLITUDE_RBV	float (ro)	Readback value of the vectorsum amplitude
SASE.TIME	integer (ro)	Unix timestamp
SASE.MONITOR	integer (ro)	Code for the monitor that triggered the last SASE phase recording: 0 – unknown 1 – GMD-T 2 – GMD-B

The server should periodically (about once every 5 min) check the status of the GMDs and decide which one can be trusted (preferred: GMD-T). If the trusted GMD shows a photon pulse energy greater than 2 μJ, the server reads the current phase and amplitude setpoints and readback values into the corresponding SASE.* properties and updates the SASE.TIME and SASE.MONITOR properties.

The history of ON_CREST.PHASE_SP and SASE.PHASE_SP could reflect the monitor code with different colors or line types (red for unknown, etc.).

The ON_CREST.PHASE_SP, ON_CREST.COMMENT, ON_CREST.MONITOR properties will either be written to by Matlab tools or manually, e.g. after an OTR screen scan. The *automatic* properties are updated by the server when it receives a write request to ON_CREST.PHASE_SP.
All SASE.* properties are only changed by the server itself.

The on-crest information will be used only for ACC1 until more sophisticated diagnostics for the other modules is available. In the mean time, these modules will be marked by .MONITOR = 0 and a corresponding .COMMENT string.