

# RF-energy saving initiative at the European XFEL

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In an effort to reduce the power consumption linked to RF operation of the European X-ray free electron laser (EuXFEL), the klystron high voltage is no longer kept constant but shaped to minimize the regulation overhead over the RF pulse. This intra-pulse dynamic change of the high power gain demands an adaptation of the low-level RF drive to stabilize the klystron signal in amplitude (up to a factor of 2) and in phase (over 360 deg.). Combining this approach with an efficient use of the rise- and fall-time of the klystron high voltage pulse, energy saving up to 30% were demonstrated at EuXFEL. This contribution presents the RF control challenge and its LLRF solution, illustrated by the experimental implementation at EuXFEL.

## Keyword

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