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## **Installation of pulsed quadrupole magnets for independent envelope tuning of multiple beamlines**

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The transverse beam envelope matching inside undulators is important for XFELs. SACLA operates two XFEL beamlines, and the beam energy and longitudinal compression are adjusted bunch-by-bunch in accordance with the XFEL parameters of each beamline. Since transverse focusing strengths depend on the beam energy and RF phases, the transverse envelope varies from bunch to bunch, and mismatch occurs to the undulator beamlines. Up to now, the beam envelopes had been adjusted and re-matched after a beam switchyard, but it takes time to properly adjust the beam optics of all beamlines. In order to facilitate this procedure, 15 pulsed quadrupole magnets have been installed in the downstream section of the linear accelerator. With these magnets, the electron bunch energy can be freely changed between 5 GeV and 8 GeV maintaining the identical transverse envelopes for all beamlines. Another 6 pulsed quadrupole magnets are also introduced for the bunches injected to SPring-8 and fine optics tuning. In this presentation, the strategy of introducing pulsed quadrupole magnets and the results of beam tuning will be presented.

### **Footnotes**

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