



Contribution ID: 13

Type: **Talk**

Laser diagnostics for particle acceleration experiments

Wednesday, 3 October 2018 16:45 (20 minutes)

In the last years the power of the laser increases dramatically reaching Petawatt level. This unique high power is achieved mainly by decreasing the pulse duration down to tens of femtosecond. The characterization of this laser pulses requires special techniques, creating a research field on it's on. In addition to that, the high power increases the difficulty of fully characterize this laser system.

This problem could be divided in different fields: short pulse characterization, contrast, beam characterization and beam sampling. Each of these fields are related to a particular parameter and/or problem.

All these fields will be discussed in the talk, within benefit and/or limitation of the different techniques and the different issue in setting up the diagnostic for a high power laser beam, focusing the emphasis on the laser parameters crucial for the electron acceleration experiments, like pointing stability and pulse front tilt.

Finally, a brief introduction of the new short pulse beamline in construction at the Vulcan facility, aiming to delivery 20J in 30fs for betatron imaging, will be presented, with the plan for the short pulse diagnostics.

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Session Classification: Special session: Advanced techniques of acceleration