VEGA Petawatt laser facility: current system capabilities

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VEGA system is a Petawatt laser facility belonging to the Spanish Pulsed Lasers Center (Salamanca, Spain). The facility infrastructure allows the possibility to develop experiments for better understanding the physics of linear and non-linear interactions of intense lasers with matter.

This laser facility is a Ti:Sapphire Chirped Pulse Amplification-based chain that has three common frontend outputs called VEGA 1,2 and 3 with characteristics shown in Table 1.

Table 1. VEGA system outputs characteristics

|  |  |  |  |
| --- | --- | --- | --- |
|  | VEGA 1 | VEGA 2 | VEGA 3 |
| Peak pulse energy | 500 mJ | 5 J | 30 J |
| Pulse temporal width | 30 fs | 30 fs | 30 fs |
| Repetition Rate | 10 Hz | 10 Hz | 1 Hz |
| Power | 16 TW | 160 TW | 1 PW |

This configuration offers the possibility of multiple pump-probe experiments. Besides this, a near future installation of an additional 1 kHz, 600 J, 6 fs carrier envelope phase laser system synchronized with VEGA oscillator, opens the possibility of having a temporal shorter probe.

This research infrastructure is user oriented trough different calls open to the scientific community. To offer enough beam quality for experimental user setups, specific laboratory conditions management as well as reliable laser sources with proper pulse characterization are needed.

In this work a description of the layout of the laser system and lab conditions is presented. We also include a summary of improvement plans for the management of the different laser outputs as well as fast highlights of the operational experience obtained from the first user access call developed during 2018 with VEGA 2 output.