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Commissioning of X-LAB: a very high-capacity X-band RF test stand facility at the University of Melbourne

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The Compact Linear Collider (CLIC) beam-based acceleration baseline uses high-gradient travelling wave accelerating structures at a frequency of 12 GHz. In order to prove the performance of these structures at high peak power and short pulse width RF, two klystron-based test facilities will been put in operation this year. The first Southern Hemisphere X-band Laboratory for Accelerators and Beams (X-LAB) is under commission at the University of Melbourne, and it will operate half of the CERN X-band test stand system, called XBOX3. XBOX3 uses a novel way of combining relatively low peak power (6 MW) but high average power klystron units whose power is steered to feed two testing slots with RF to the required power with a repetition rate of up to 400 Hz. Besides the repetition rate, peak power, pulse length and pulse shape can be customized to fit the test requirements. This novel way of combining pulsed RF high power can eventually be used for many other applications where multiple test slots are required.

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