Beam Modes from updated ESS-0038258 Description of Modes for ESS Accelerator Operation Rev 5

|  |  |  |  |
| --- | --- | --- | --- |
| Old Key as per previous revision REV4 | New Key as per Gitlab file | Name | Description |
| 0 | 0 | No Beam | No Beam |
| Not in previous document | 1 | Conditioning | Plasma production, magnetron allowed but no extraction HV |
| 10 | 2 | Probe | First beam through a particular section; non-damaging even in the case of total beam loss (even repeated); used to verify that machine configuration is not grossly incorrect |
| 16 | 3 | Fast commissioning | Limited beam loading; used for fast scans to rapidly determine/verify RF setpoints |
| Not in previous document | 4 | RF Test | To perform an initial RF test with a longer pulse |
| Not in previous document | 5 | Stability Test | To be used mostly for beam stability test |
| 14 | 6 | Slow Commissioning | Very short pulse planned to be used used during Normal Conducting Linac commissioning. It would allow installation of the rest of the Linac in parallel to Beam Commissioning. |
| 30 | 7 | Fast tuning | Limited beam loading; used for fast scans to rapidly determine/verify RF setpoints and measure beam profiles with wire scanners. |
| 20 | 8 | Slow tuning | Largest charge per pulse that allow operation of invasive proton beam instrumentation devices like wire scanners; long enough beam pulses to diagnose and monitor RF feedback and the onset of beam loading; used to perform more precise single-pulse measurements |
| 40 | 9 | Long pulse verification | Only used when machine reasonably tuned to the tuning dump or the target; slowly-increasing pulse lengths are used to tune RF feedforward, verify beam loading and Lorentz force detuning compensation, and tune for low beam losses. Iintermediate short pulses at 1Hz could be supplied to monitor stability between long pulses.[[1]](#footnote-1) |
| 50 | 10 | Shielding verification | To be defined better once the exact requirements for the shielding verification (power, pulse length) are known |
| 60 | 11 | Production | Normal mode for NSS experiments during operation. |

Destinations from updated ESS-0038258 Description of Modes for ESS Accelerator Operation Rev 5

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| --- | --- | --- | --- | --- |
| Old Key as per previous revision | New Key as per Gitlab file | Name | Type | Limits |
| 5 | 1 | ISrc | Virtual destination for plasma conditioning | Only for conditioning mode/0/0/0 |
| 10 | 2 | LEBT | Faraday Cup | Full beam |
| 20 | 3 | MEBT | Faraday Cup | (1 Hz, 50 s)/(14 Hz, 5 s), 62.5 mA |
| 30 | 4 | DTL2 | Faraday Cup | (1 Hz, 50 s)/(14 Hz, 5 s), 62.5 mA |
| 40 | 5 | DTL4 | Faraday Cup | (1 Hz, 50 s)/(14 Hz, 5 s), 62.5 mA |
| 50 | 6 | Spokes | Beam Stop | To be defined |
| 60 | 7 | MBL | Beam Stop | To be defined |
| 70 | 8 | Tuning Dump | Dump | 12 kW |
| 80 | 9 | Target | Target | 5 MW |

1. [↑](#footnote-ref-1)