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CW Measurements of TESLA and SC Gun Cavities with the Cornell LLRF System at HoBiCaT

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In Energy Recovery Linacs, such as the Cornell ERL or BERLinPro, the main linac cavities are operated in CW at low beam-loading. The choice of the loaded Q is driven by two opposing factors. Limited RF power favors for a high external Q to allow operation at the desired field level, while a higher Q and such a narrow bandwidth leads to increasing field instability in presence of microphonics detuning or even ponderomotive instabilities.
To determine the optimum coupling for ERL main Linac operation, LLRF measurements with the Cornell system were performed at HoBiCaT to study the field stability at given microphonics detuning of a TESLA cavity for different gain settings and external Q values. Stable operation at external Q up to 2e8 was demonstrated with field's phase stability of 0.02 degrees.
Further, the same system was used to operate a SC 1.6 cell gun cavity in CW mode. Results of the measured field stability, microphonics detuning and first studies of beam parameters will be presented as well.

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