

Harmonic cavity studies for the SOLEIL Upgrade

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In 4th generation low emittance synchrotron light sources, harmonic cavities are critical components needed to reach the required performance.

However, RF systems with harmonic cavities are limited by their own set of

instabilities: the 'slow-moving transient instability' can prevent the RF system from reaching the flat potential conditions, hence limiting the maximum bunch lengthening, the AC Robinson sets a limit on the low beam current operation and the HOM coupled bunch instability threshold can be lower as compared to the single RF case, despite the added Landau damping.

Here we report how these instabilities could impact the performance and influence the choice between different technologies and harmonic (3rd and

4th) for the SOLEIL Upgrade.