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166.6 MHz HOM damped copper cavity designed for 4th generation synchrotron radiation sources

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The fourth-generation synchrotron light sources aim to achieve ultralow emittances and have very small dynamic aperture, which are expected to adopt on-axis injection schemes. Lower frequency rf systems are required for a large separation between RF buckets due to the limitations of kicker. We designed a 166.6 MHz normal conducting cavity with HOM damped used for the main cavity of storage ring. In this paper, we present the simulation studies of cavity including electromagnetic, HOMs, mechanical, and thermal calculations. A compact beam line absorber, which is uncommon in the copper cavities, is adopted to damp the harmful HOMs. The simulation results show that it can deeply damp the HOMs, but has no effect on the accelerating performance.

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