



Contribution ID: 1351 Contribution code: WEPA132

Type: **Poster Presentation**

Basic high-power design of a 1.5-GHz TM020-type harmonic cavity for the KEK future light source

Wednesday, 10 May 2023 16:30 (2 hours)

In ultralow-emittance synchrotron light sources, harmonic RF cavities are very useful to lengthen the beam bunches by which the adverse effects due to intrabeam scattering can be mitigated. We are developing a 1.5-GHz TM020-type normal-conducting harmonic cavity which is to be used for the KEK future light source project. The harmonic cavity using the TM020 resonant mode has distinct advantages such as: 1) small RF-voltage fluctuation under the transient beam loading, and 2) sophisticated parasitic-mode damping structure which locates at the node of the accelerating field. In our design, we optimized* the inner shape of the cavity so that the coupling impedances due to parasitic modes were minimized. To minimize the losses of accelerating field in the parasitic-mode damping structure, we arranged three frequency-tuners symmetrically and devised an optimum loop of an input coupler, by which an axial symmetry of the cavity was almost maintained. Based on these concepts, we conducted a basic design of high-power cavity including thermal-structural analysis, which will be presented in this paper.

Funding Agency

This work is supported by JSPS KAKENHI Grant Numbers JP17K05131 and JP20H04459 and JST SPRING Grant Number JPMJSP2104.

Footnotes

- T. Yamaguchi et al., IPAC2021, MOPAB343.

I have read and accept the Privacy Policy Statement

Yes

Primary author: YAMAGUCHI, Takaaki (Sokendai, the Graduate University for Advanced Studies)

Co-authors: YAMAMOTO, Naoto (High Energy Accelerator Research Organization); NAITO, Daichi (High Energy Accelerator Research Organization); TAKAHASHI, Takeshi (High Energy Accelerator Research Organization); SAKANAKA, Shogo (High Energy Accelerator Research Organization)

Presenter: YAMAGUCHI, Takaaki (Sokendai, the Graduate University for Advanced Studies)

Session Classification: Wednesday Poster Session

Track Classification: MC7: Accelerator Technology and Sustainability: MC7.T06: Room Temperature RF