Study on shape of inner wall surface to suppress the multipactor occured in the J-PARC SDTL

T. Ito[1#], K. Hirano[1]

[1]*JAEA, Tokai, Ibaraki 319-1195, Japan*

 # a corresponding author: itou.takashi@jaea.go.jp

Due to multipactor discharges occurring on the inner wall surface of the cavity, some SDTL cavities could not be operated at their design rf power [1-2]. This problem was able to be solved by cleaning that is removing dust and oil from the inner wall surface [3]. The simulations conducted to investigate the cause of the multipactor showed that the multipactor on the inner walls surface of the cavity were unavoidable with cavity diameter and drift tube diameter of the SDTL. On the other hand, a result of visual inspection found that even at locations where simulations showed multipactor to occur, multipactor did not occur in the vicinity of ports and slit geometries or other areas where the cavity inner wall was deformed. This paper reports multipactor simulation results with varying geometry of the inner wall surface of the SDTL cavity and the effect of suppression.

References

[1] T. Ito et al., “Multipactor at SDTL Cavity in J-PARC Linac”, in Proc. the 9th Annual Meeting of PASJ, Aug. 2012, paper THPS088, pp.1152.

[2] T. Ito et al., “MULTIPACTOR PROBLEM OF J-PARC SDTL”, Proceedings of IPAC2017, Copenhagen, Denmark (2017).

[3] T. Ito et al., “Cavity cleaning for suppression of multipactor occurred at the J-PARC SDTL”, in Proc. the 19th Annual Meeting of PASJ, Aug. 2022, paper FROA10, p193.