

4. Summary

In summary, we have discussed the detailed characteristics and the generation mechanism of the SWs on a structured perfect conductor surface. In the case of the MHA of the perfect conductor, the SWs play a crucial role in the resonant transmission. Our analysis, based on the FDTD method, has provided a detailed understanding of how the SWs are excited. The incident electromagnetic wave excites the edge mode at the edge of the metal holes. This excitation process is a nonresonant process that occurs in a broad frequency range. Then, the energy of the edge mode is transferred to the electromagnetic wave that propagates along the metal surface, resulting in the excitation of the SWs even on the perfect conductor surface. We believe that although our analysis is for SWs on the perfect conductor surface, a similar mechanism is possibly applied to the excitation of the SPPs that take a dominant role in the visible or near-infrared regions.

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