Some Conceptual Designs for Variably Polarizing Leaf -APPLE Undulator

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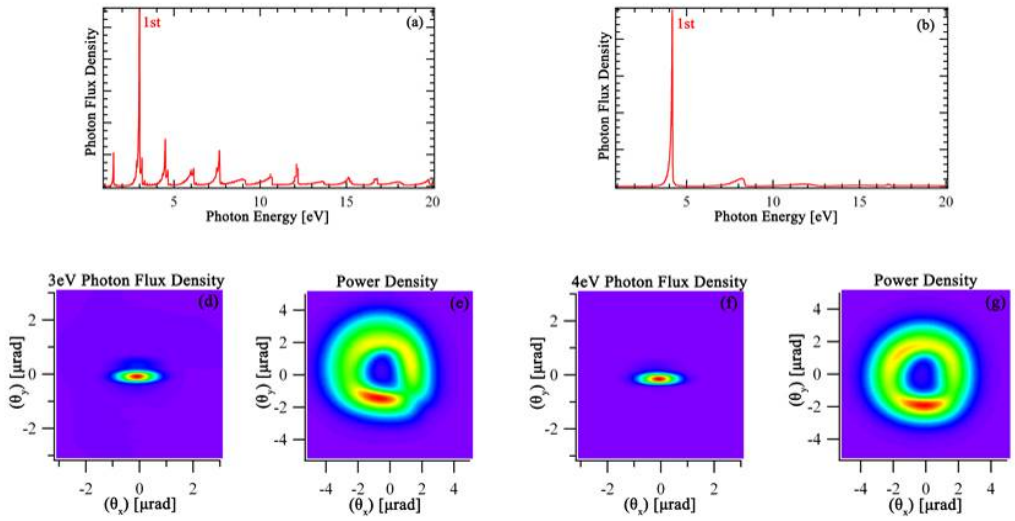
An intense on-axis undulator radiation power is often causes an unwanted heat load problem. Especially, this problem is significant for low energy photon users in medium to high energy SR facilities. To solve this problem, the Figure-8 undulator and the APPLE-Knot undulator are deployed in some light source facilities. One of the other powerful candidates to provide a better solution of the same problem is a Leaf unduator [1].

However, this excellent idea has not yet been materialized. Several years ago, a simple permanent magnet structure of Leaf undulator was proposed [2]. Based on this structure, we have developed some models of pure permanent magnet structures and electro-magnetic structures including a superconducting undulator with the capability of variable polarization. The figure below shows examples of radiation spectra and radiation distribution. Details of magnetic structures and the mechanism of changing polarization will be presented in the conference.



Top: Spectral on-axis flux densities in (a) Leaf mode and (b) Helical mode. Bottom: Fundamental photon flux densities and power density distributions for Leaf mode and Helical mode.

References

[1] J. Yan and S. Qiao, Rev. Sci. Instrum. **81**, 056101 (2010).

[2] T. Yamamoto, Master Thesis, Graduate School of Science, Hiroshima Univ., 2012 (unpublished).