

## Channeling 2018



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# X-ray Hybrid Radiation

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Transition and Cherenkov radiation generated by a charge are well known phenomena and find a broad application for different scientific communities. Frank was the first to point out the possibility of interference between transition and Cherenkov radiation [1]. This interference is understandable, since both radiation mechanisms may be described as a secondary electromagnetic field produced by polarization currents that emerge from the interaction of an electromagnetic field of a charge with atomic electrons of the medium. In 1979 Zrelov and Ruzicka conducted theoretical investigations of this interference effect in the visible wavelength range [2]. They showed that the emitted radiation possessed both transition and Cherenkov radiation properties, i.e., that it is a hybrid radiation. However, despite the critical interest for development of new x-ray monochromatic sources, the theoretical investigations ignored this effect in x-ray range.

In this report we present results of the theoretical investigation for x-ray hybrid radiation. Using the polarization current approach [3,4] and the atomic scattering factor formalism [5] to account anomalous dispersion of the complex permittivity we study spectral and angular distributions and polarization properties of x-ray hybrid radiation when a charge passes over a screen.

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### References

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