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Correlations in thermal vibrations of crystal atoms. Effect on bremsstrahlung and dechanneling

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Thermal vibrations of neighboring atoms are correlated : long wavelength phonons make them displace in the same direction. For channeled particle the correlated displacements make dechanneling faster. For channeled electrons or positrons, it increases the coherence of bremsstrahlung over consecutive atoms, making a kind of semi-coherent contribution to bremsstrahlung . These effects are studied in the binary collision approach. The validity of this approach is discussed in the light of quantum scattering theory.

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