Hyperuniformity, Quasicrystals, and Photonics

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This talk will begin with a review of the notion of hyperuniformity, an order metric originally defined in terms of spectral intensity that was first applied to crystalline and disordered point patterns (1)]. We will then explain how the hyperuniformity criterion must be generalized in the case of quasicrystals and related patterns because the support of the spectral intensity is dense and discontinuous (2-3). These results reveal that a remarkable range in the degree of hyperuniformity is possible and, in some cases, the surprising absence of hyperuniformity altogether. Some implications for the photonic properties of hyperuniform photonic solids will be discussed (4-5), including some recently discovered universal properties disordered ones share with crystalline photonic solids (6).

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References

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