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Improved Numerical Model of Diffraction Patterns Produced by Synthetic Opals Implementing Finite-Size Sphere Scattering LILIANA RUIZ DIAZ, MALIK RAKHMANOV, University of Texas at Brownsville — We continue our investigation of diffraction patterns produced by synthetic opals which are self-assembled photonic crystals. These opals consist of domains in which silica nanospheres are arranged in roughly uniform crystalline structures. Our previous experiments showed that these structures produce particular diffraction patterns when light is incident on a single domain. In an attempt to understand these patterns, we created a numerical model in which the nanospheres were represented by lattice points. In order to obtain a more accurate simulation we now replace the lattice points by dielectric spheres which scatter light according to Maxwell equations. This new model leads to a more realistic picture of the diffraction patterns. It allows us to modify the crystalline structure of the opal, change the physical properties of the nanospheres, and include defects.

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