

## **study on scattering properties between slightly rough wafer and the defects particles**

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Extracting effectively the optical surface roughness and defect character have important realistic value to improve the optical system efficiency. The detection and control of the optical surface roughness and defect particles is one of the most important research points about the preparation the optical surface and the nanometer/subnanometer structural material. In order to meet the increasing requirements of high-quality optical system, the pure and roughness of optical surface has to be improved. Based on the wavelet MOM method, the difference field scattering properties between slightly rough wafer and the defects particles are researched. The integral equations about slightly rough optical surface and the redundant particles are presented from the basic electric field integral equations. The impedance matrix, composite scattering field and the difference scattering field are obtained. Bistatic Radar Cross Section calculation formula of the composite scattering model are given. Bistatic Radar Cross Section and Difference Bistatic Radar Cross Section are analysis between different material one/double redundant particles and slightly rough wafer with different incident angle and numerical experiments are shown. The scattering contribution and difference field scattering angular distribution of the redundant particles or rough wafer surface are provided. The results are shown that 1)the extremum points appear in the mirror direction of incident angle and the metal particles contribution is larger than the dielectric particles;2)the mirror direction contribution is more obvious than wavelength's;3) It is an important task for project to improve the study on difference field scattering properties and the effects of roughness factors for nano-sized particles detection.