

# Partial Differential Equations Seminar

**Title** MUSIC algorithm in three-dimensional inverse electromagnetic scattering problem

**Speaker** 강상우 박사

**Affiliation** KAIST 수학과

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## Abstract

We present the MUSIC (MUltiple Signal Classification) algorithm for imaging small inhomogeneities in a three-dimensional inverse electromagnetic scattering problem. The idea of the MUSIC-type imaging scheme is to characterize the range and noise subspaces of the MultiStatic Response (MSR) matrix. Then, due to the orthogonality of the subspaces, MUSIC's indicator function has a peak value at the locations of inhomogeneities. The MUSIC algorithm is well-known to be a fast and robust non-iterative imaging scheme in various scattering problems. However, via prior works, it is not sufficient to explain the exact reason for the unexpected artifacts of the map of the MUSIC algorithm in the three-dimensional inverse electromagnetic scattering problems. Hence, we investigate the asymptotic structure of the MUSIC algorithm within the far-field framework. Numerical simulations, with synthetic and experimental data, are illustrated to validate the theoretical results.



**연세대학교 수학기산학부**

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