



# On a link between kernel mean maps and Fraunhofer diffraction, with an application to super-resolution beyond the diffraction limit

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We establish a link between Fourier optics and a recent construction from the machine learning community termed the kernel mean map. Using the Fraunhofer approximation, it identifies the kernel with the squared Fourier transform of the aperture. This allows us to use results about the invertibility of the kernel mean map to provide a statement about the invertibility of Fraunhofer diffraction, showing that imaging processes with arbitrarily small apertures can in principle be invertible, i.e., do not lose information, provided the objects to be imaged satisfy a generic condition. A real world experiment shows that we can super-resolve beyond the Rayleigh limit.

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