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Obstacle problems for nonlocal operators with singular kernels

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Abstract. In this paper we establish optimal regularity estimates and smoothness of free boundaries for nonlocal obstacle problems governed by a very general class of integro-differential operators with possibly singular kernels. More precisely, in contrast to all previous known results, we are able to treat nonlocal operators whose kernels are not necessarily pointwise comparable to that of the fractional Laplacian. Such operators might be very anisotropic in the sense that they "do not see" certain directions at all, or might have substantial oscillatory behavior, causing the nonlocal Harnack inequality to fail.

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