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JAMES HOLLAND, Weak Indestructibility and Reflection, Rutgers University, New Brunswick, NJ, USA, 2023. Supervised by Grigor Sargsyan. MSC: 03E55, 03E35, 03E45. Keywords: forcing, indestructibility, strong cardinals, reflecting strongs, core model.

Abstract
There is a balance between the amount of (weak) indestructibility one can have and the amount of strong cardinals. It’s consistent relative to large cardinals to have lots of strong cardinals and all of their degrees of strength are weakly indestructible. But this necessitates the destructibility of the partially strong cardinals. Guaranteeing the indestructibility of the partially strong cardinals is shown to be harder. In particular, this work establishes an equiconsistency between:

1. a proper class of cardinals that are strong reflecting strongs; and
2. weak indestructibility for (κ+2)-strength for all cardinals κ in the presence of a proper class of strong cardinals.

These have a much higher consistency strength than:

3. weak indestructibility for all degrees of strength for a proper class of strong cardinals.

This discrepancy holds even if we weaken (2) from the presence of a proper class to just two strong cardinals. (2) is also equivalent to weak indestructibility for all λ-strength for λ far beyond (κ+2); well beyond the next measurable limit of measurables above κ, but before the next μ that is (μ+2)-strong.

One direction of the equiconsistency of (1) and (2) is proven using forcing and the other using core model techniques from inner model theory. Additionally, connections between weak indestructibility and the reflection properties associated with Woodin cardinals are discussed, and similar results are derived for supercompacts and supercompacts reflecting supercompacts.

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