# 世界最大の太陽ダイナモ計算で明らかになった大規模磁場生成のメカニズム
# Generation mechanism of large-scale magnetic field revealed with high-resolution solar dynamo calculation

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We carry out series of high-resolution solar dynamo calculations in spherical geometry to investigate generation mechanism of large-scale magnetic field. Solar observations indicate large-scale magnetic field in the solar interior in spite of the chaotic and turbulent fluid motion. Recent high-resolution calculations show that higher-resolution calculations generate weaker large-scale magnetic field, since small-scale turbulence tends to destruct the coherent large-scale magnetic field. In order to address this issue, we carry out a series of higher-resolution calculations. In our "middle"-resolution calculation, we find the same result as previous studies, i.e., when we increase the resolution, the large-scale magnetic field loses its energy. In our unprecedentedly high-resolution calculation, however, large-scale magnetic energy is recovered. In the calculation, we find an efficient small-scale dynamo which leads to strong Lorentz feedback in the small scale. The small-scale turbulent motion, which tends to destructs the large-scale magnetic field is suppressed. As a consequence, the large-scale magnetic field is maintained even with large Reynolds numbers.

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