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Ramp-Reversal-Memory: A New Kind of Memory Effect in Transition **Metal Oxides**

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Transition metal oxides (TMOs) are complex electronic systems which exhibit a multitude of collective phenomena. Two archetypal examples are VO2 and NdNiO3, which undergo a metal-insulator phase-transition (MIT), the origin of which is still under debate. We have discovered a new kind of memory effect in both systems, manifest through an increase of resistance at a specific temperature, which is set by reversing the temperature-ramp from heating to cooling during the MIT, thus we call it 'Ramp Reversal Memory'. The characteristics of this memory effect do not coincide with any previously reported history or memory effects in similar systems. From a broad range of experimental features, supported by theoretical modelling, we claim that the main ingredients for the effect to arise are the spatial phase-separation of metallic and insulating regions during the MIT and the coupling of lattice strain to the local critical temperature of the phase transition. We predict that similar ramp-reversal effects exist also in other systems.