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The Final Season Reimagined: 30 Tidal Disruption Events from the ZTF-I Survey

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Tidal disruption events (TDEs) offer a unique way to study dormant black holes. While the number of observed TDEs has grown thanks to the emergence of wide-field surveys in the past few decades, questions regarding the nature of the observed optical, UV, and X-ray emission remain. We present an analysis of a uniformly selected sample of 30 spectroscopically classified TDEs from the Zwicky Transient Facility Phase I survey operations with follow-up Swift UV and X-ray observations. We investigate correlations between light curve properties and spectroscopic classes of TDEs, and we recover a difference between the light curve timescales of the four TDE classes, with TDE-H+He having longer rise times. We introduce a new spectroscopic class of TDE, TDE-featureless, which are characterized by featureless optical spectra. The new TDE-featureless class shows larger peak bolometric luminosities, peak blackbody temperatures, and peak blackbody radii. We also examine the differences between the X-ray bright and X-ray faint populations of TDEs in this sample. We present a scheme for classifying the shapes of the optical light curves, finding that TDEs with “structured” light curves have significantly less massive host galaxies than other types of TDEs. This sample of optically selected TDEs is the largest sample of TDEs from a single survey yet, and the systematic discovery, classification, and follow-up of this sample allows for robust characterization of TDE properties, an important stepping stone looking forward toward the Rubin era.