

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Avalanche processes in the star KIC 8462852 (Tabby's star)¹ MOHAMMED SHEIKH, RICHARD WEAVER, KARIN DAHMEN, Univ of Illinois - Urbana — Tabby's star (KIC 8462852) has shown unexpected drops in light flux of more than one fifth of its median value. From the light curve (flux vs. time), we relate the drops in light flux to avalanches studied in condensed matter systems such as ferromagnetism and plastic flow. Similar to other studies of avalanches, we define a threshold below which we consider an event to be an avalanche. These avalanches are characterized by a size, defined as the net radiant energy per unit area lost, and a duration, defined as the time the avalanche remains under the threshold. Near criticality, avalanche sizes and durations are expected to follow power law distributions with cutoffs. We identify the exponents of these power law distributions using the small avalanches in the light curve, and show that they roughly conform to a mean field theory. In addition, we also look at the the large events that have caused interest in Tabby's star. The large events are not within the scaling regime, and are possibly limited by system size. However, a model allowing for dynamic weakening as avalanches are nucleated can be used to explain these events in the context of mean field theory.

¹NSF PHY-1125915, NSF DMR 10-05209, NSF CBET 1336634

Mohammed Sheikh
Univ of Illinois - Urbana

Date submitted: 12 Nov 2016

Electronic form version 1.4