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Spatio - Temporal Organization of the Intermittent Irradiance in the Quiet Solar Corona

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Using data from the EUVI instrument on board the STEREO spacecraft, we show, for the first time, that energy release events in the quiet solar corona exhibit random occurrence times described by an exponential probability distribution of interevent intervals exceding the charateristic Alfven transit time, and the temporal correlation dimension equal to one. This random temporal behavior is accompanied by a pronounced spatial clustering of event locations which mimics the supergranulation pattern of the underling photospheric network. Random temporal organization of the quiet Sun revealed by two independent statistical techniques is in a sharp contrast with power-law interevent time distributions of flaring events in solar active regions reported in previous studies. We propose that quiet solar corona, which is believed to be responsible to the bulk coronal heating, operates as a critical avalanching system driven by spatially nonuniform injection of the photospheric magnetic flux. Graph analysis of nearly-simultaneous dissipation events suggests that quiet-Sun avalanches may involve spatially disconnected sympathetic brightenings interacting across vast coronal distances.