

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Direct visualization of photoinduced glassy dynamics on the amorphous silicon carbide surface by STM movies DUC NGUYEN, LEA NIENHAUS, RICHARD T. HAASCH, JOSEPH LYDING, MARTIN GRUEBELE, Univ of Illinois - Urbana — Glassy dynamics can be controlled by light irradiation. Sub- and above-bandgap irradiation cause numerous phenomena in glasses including photorelaxation, photoexpansion, photodarkening and photoinduced fluidity. We used scanning tunneling microscopy to study surface glassy dynamics of amorphous silicon carbide irradiated with above- bandgap 532 nm light. Surface clusters of ~ 4 -5 glass forming unit in diameter hop mostly in a two-state fashion, both without and with irradiation. Upon irradiation, the average surface hopping activity increases by a factor of 3. A very long (~ 1 day) movie of individual clusters with varying laser power density provides direct evidence for photoinduced enhanced hopping on the glass surfaces. We propose two mechanisms: heating and electronic for the photoenhanced surface dynamics.

Duc Nguyen
Univ of Illinois - Urbana

Date submitted: 20 Oct 2014

Electronic form version 1.4