MICHIGAN FIREBALL OF JANUARY 17, 2018

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BASIC OVERVIEW

- Occurred on January 17, 2018 at 01:08:30 UTC (2018 January 17 7:08:30 PM CST)
- Over 600 eyewitness accounts
- Caught on security and dash cameras throughout the region
- Detected by the NASA all sky meteor camera at Oberlin College
- Superbolide class event (superbolides have a magnitude of -17 or brighter, in between the Full Moon and Sun in brightness)
WHAT WE KNOW

Speed – 15 km/s  
Start height (video) – 86 km  
End height (video) – 18 km  
Very steep entry angle – 22° from vertical
Light curve
MANUAL TPFM MODEL FIT

Diameter = 68 cm
Strength = 2.7 Mpa
Bulk density = 3700 kg m$^{-3}$
Mass = 609 kg
KE = 16.4 tons TNT
MCMC TPFM RESULTS

RINF: 0.311 - 0.020 + 0.039 (meters)
VINF: 14.904 - 0.006 + 0.004 (km/s)
ZR: 22.479 - 0.003 + 0.008 (degrees)
NUMBMAX: 256.000 - 0.000 + 0.000
SFINF: 1.209 - 0.005 + 0.007
MU: 0.667 - 0.008 + 0.007
POR CLASS: 1 (ordinary chondrite)
STRMOD: 1.267 - 0.171 + 0.140
TSTROVER: 2.583e+06 - 6.071e+05 + 1.230e+06 (Pascals)
SIGMA_HEIGHT: 1.125 - 0.070 + 0.082 (km)
SIGMA_MAG: 1.260 - 0.184 + 0.168 (magnitude)
INFRASOUND AND SEISMIC SIGNATURE

Energy upper limit of 50 tons TNT; nominal close to 10 tons TNT

Event caused a magnitude 2 tremor
Dark flight calculations
Doppler radar signature of falling meteoritic dust
METEORITE FINDS
GLM level 2 match to light curve