The Long Wavelength Array (LWA-1):
Coincident Radio Transients from NS-NS Mergers

LIGO-Virgo Event Follow-Up Program

John Simonetti, Virginia Tech
Michael Kavic, LIU
Gregory Taylor, UNM, LWA
Peter Shawhan, UMD

258 crossed dipole antennas
10-88 MHz
4 steerable beams
2 tunings per beam
All-sky mode also possible

UNM
VT
LANL
JPL
NRL
NRAO
AFRL

M.S. Pshirkov, K.A. Postnov
Astrophys. Space Sci. 330, 13-18 (2010)
NS-NS merger, prompt 10ms radio transient

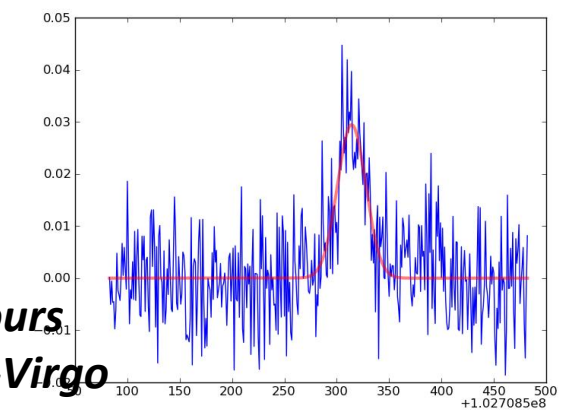
$$\dot{E} \sim \frac{\Omega^4 B^2 R^6}{c^3}. \sim 10^{50} \text{ erg s}^{-1}$$

$$f_\nu \sim 0.6\ \dot{E}_{50} D_{\rm Gpc}^{-4} \nu_{120}^2 \quad \text{Jy}$$

LWA-1 can detect to ~ 1 Gpc, with dispersive delays of 4–24^m at 30MHz for DM = 50–300 pc cm^{-3}

Pulsar B0950+08 Giant Pulses (~ 10 per hour)

39 MHz, BW=16 M
Strongest pulse:
15.8 sigma
10.9 ms
306 Jy



Over 600 beam-hours awarded for LIGO-Virgo collaborative work