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## Optimal follow-up observations of gravitational wave events with small optical telescopes

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We discuss optimal direction for follow-up observations by 1-3 m class optical/infrared telescopes which target optical/infrared counterparts of gravitational wave events detected with two laser interferometric gravitational wave detectors. The probability maps of transient sources, such like coalescing neutron stars and/or black holes, determined with two laser interferometers generally spread widely. They include the distant region where it is difficult for small aperture telescopes to observe the optical/infrared counterparts. For small telescopes, there is a possibility that it is more advantageous to search for nearby region even if the probability inferred by two gravitational wave detectors is low. We show that in the case of first three events of advanced LIGO, the posterior probability map, derived by using a distance prior restricted to a nearby region, is different from that derived without such restriction. This suggests that the optimal direction for small telescopes to perform follow-up observation of LIGO's three events are different from what has been searched so far. We also show that, when the inclination angle of the binary is nearly edge-on, it is possible that the true direction is not included in the 90% posterior probability region. We discuss the optimal strategy to perform optical/infrared follow-up observation with small aperture telescopes based on these facts.

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