

[구GW-03] Pulsar binaries and GW detection

Chunglee Kim
Seoul National University

Pulsar binaries in tight orbits are considered to emit strong gravitational waves (GWs) during the last stage of their coalescences. They form a subset of compact binary mergers, which consists of white dwarfs (WDs), neutron stars (NSs), or black holes (BHs). One of the most famous example of 'merging' pulsar binaries is the Hulse-Taylor pulsar (PSR B1913+16) discovered in 1974 by Russell Hulse and Joseph Taylor. About ten NS-NS and several tens of NS-WD binaries are known in our Galaxy. Merging binaries are rare and only a few NS-NS and NS-WD have been discovered to date. A pulsar with a black hole companion is also theoretically expected, but there is yet no detection. Within several years, direct detections of GWs from compact binary mergers will be made by laser interferometers. This will pave a way to study physics of compact binaries that cannot be reached by electromagnetic waves (EM). Pulsar binaries are of particular interest as we can use both EM and GW to probe these systems. In this talk, we present a brief overview on the Galactic pulsar populations and discuss their implications for GW detection.

[구GW-04] Gravitational Wave Data Analysis Activities in Korea

Sang-Hoon Oh
National Institute for Mathematical Sciences

Many techniques for data analysis also based on gaussian noise assumption which is often valid in various situations. However, the sensitivity of gravitational wave searches are limited by their non-gaussian and non-stationary noise. We introduce various on-going efforts to overcome this limitation in Korean Gravitational Wave Group. First, artificial neural networks are applied to discriminate non-gaussian noise artefacts and gravitational-wave signals using auxiliary channels of a gravitational wave detector. Second, viability of applying Hilbert-Huang transform is investigated to deal with non-stationary data of gravitational wave detectors. We also report progress in acceleration of low-latency gravitational search using GPGPU.