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Alteration of brain communication due to abnormal patterns of synchronization is nowadays one of the most suitable mechanisms for having a better understanding of brain pathologies. Very recently, it has been proved that abnormal changes in both local and long range functional interactions underlie the cognitive deficits associated with different brain disorders. Mild cognitive impairment (MCI) is a state characterized for cognitive dysfunction, such as the memory. The study of the spatial and dynamic alterations in MCI subjects’ functional networks could provide important evidences of the brain mechanisms responsible for such impairment. Moreover, there is a growing interest in the role of ApoE genotype in pathological aging. However, its relation with brain electromagnetic activity patterns needs to be looked into. Here we use magnetoencephalography (MEG) to record resting state activity of healthy elderly people and patients with MCI, with both eyes closed and eyes open. Their ApoE genotype was also determined via a genetic test. Additionally, the subjects had a neuropsychological test done to determine their MCI subtype. Our database consists in 40 healthy elderly people and 60 MCI patients (30 with amnestic type and 30 with multidomain type). In order to provide a functional connectivity pattern, we calculate the Synchronization Likelihood of the MEG time series. The analysis is done for the classical frequency bands, via a statistical test to search for differences between groups with different diagnosis and ApoE genotype. Our result shows an increased connectivity in genotype 3-4 and 4-4, when compared with 2-3 and 3-3. Thus, regardless of having multidomain or amnestic MCI, carriers of APOE allele 4 showed higher synchronization values than controls or non APOE 4 carriers. This indicates a potential link between high synchronization (as a sign of abnormal communication) and a genetic risk for the development of dementia.