



ΕΚΤΑΚΤΗ ΟΜΙΛΙΑ
ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

Γεώργιος Καραθανάσης*
CERN

*« Searching for New Physics in lepton
flavour violating signatures with innovative
triggering techniques »*

Τετάρτη 4 Δεκεμβρίου 2024, ώρα 13:00

ZOOM Link

<https://cern.zoom.us/j/67346430985?pwd=Bcdnc2lyQ0w51doHEQVekmSfSyYYnD.1>

Meeting ID: 673 4643 0985 Passcode: 721228

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ΠΕΡΙΛΗΨΗ

My name is Georgios Karathanasis, and I am currently a research fellow at CERN, affiliated with the Compact Muon Solenoid (CMS) experiment. In this talk, I will present the work I conducted during my PhD and PostDoc. My research focuses on two main areas: physics analysis and detector work. During my PhD at the National and Kapodistrian University of Athens, I worked on two analyses and the hardware trigger (L1T) of CMS. Initially, I focused on searches for New Physics in events with soft leptons and missing transverse energy (MET). In 2018, I began working on the lepton flavor universality (LFU) test in the $b \rightarrow sll$ transitions, which I led until its conclusion. To test LFU, we needed to trigger on $B \rightarrow eeK$ and $B \rightarrow \mu\mu K$ and take their ratio, known as R_K . This required a novel triggering strategy, known as B-Parking, in order to collect 10 billion B decays. During my PostDoc at the University of Colorado, I continued to lead the R_K measurement effort, finalized it, and initiated another analysis, searching for direct lepton flavor violation signals using Z boson decays. Additionally, I guided PhD students in the next iteration of the R_K measurement. On the hardware side, during my PhD, I worked on the Barrel Muon L1T trigger, developing the emulator and conducting studies. In my PostDoc, I continued working on the L1T, with an emphasis on the Phase-2 upgrade, improving track jet reconstruction, and introducing novel algorithms to trigger on rare decays such as the $W \rightarrow 3\pi$. In terms of positions of responsibility within CMS, I have served both as convener and subconvener in the Physics Object Muon Group, and currently, I am the B-physics Analysis Group convener, after serving as sub-convener in the Violation of Fundamental Symmetries subgroup. As a CERN fellow, I am working on a state-of-the-art CPV measurement, an exotic search targeting an uncovered signature of multiple soft b-jets, and L1T scouting for Phase-2.