



1222·2022  
**800**  
ANNI



UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA

**DIPARTIMENTO DI FISICA E ASTRONOMIA**  
**“Galileo Galilei” – DFA**

via F. Marzolo, 8  
35131 Padova  
tel +39 049 8277088  
fax +39 049 8277102  
CF 80006480281  
P.IVA 00742430283

To: Consiglio Direttivo  
della Scuola di Dottorato in Fisica  
dell’Università di Padova

**Subject:** Report on the research activity of PhD student Dr. Siew Yan Hoh.

Dr. Siew Yan Hoh developed his research activity during his PhD period mainly within the CMS Collaboration, providing various contributions to other technological activities too.

He participated in the construction of a set of muon detectors, based on the same drift-tubes layout exploited in CMS. Those devices were used in a fixed-target experiment in the CERN North Area, where positrons were shot on a Beryllium target to produce muon-antimuon pairs (testing the LEMMA muon source scheme for the muon collider). Siew-Yan participated actively to that experiment, from installation and commissioning, to the actual data taking and analysis.

At the beginning of his PhD, he also participated in the successful development and deployment on a local cloud system (Cloud Veneto) of a distributed analysis workflow processing di-muon events recorded by the CMS experiment and their corresponding simulated counterparts. Such processing was implemented in Spark and deployed on a dynamic Mesos cluster.

In the context of the CMS experiment, Siew-Yan initially tackled a physics analysis he started during his master thesis, concerning the search for Dark Matter candidates produced in association with heavy quarks. He carried out that work in collaboration with colleagues at Fermilab.

Finally, he focused his studies on the analysis of the production at the LHC of the Higgs boson in association with heavy vector bosons, which is the subject of his PhD thesis. SiewYan performed specific studies that are essential to the proper understanding of the data used in the analysis, and specifically contributed to the interpretation of the results in a novel theoretical framework used for the first time in this kind of search. This analysis is close to being submitted by the CMS Collaboration to peer-reviewed journals. During the second and third years of his PhD, SiewYan was officially endorsed by the CMS Collaboration as the responsible person for the set of Monte Carlo simulations relevant to the analysis, coordinating a small working group. In addition, SiewYan took part to the CMS data collection campaign in the year 2018, performing on-line shifts for the data quality monitoring.

In the last year, the pandemic situation penalized him in a particular way, since he was forced to leave Padua for 5 months to go back in his country (Malesya); for this reason he asked and obtained by the University Rector a 6 months extension of his PhD period, to recover for the time lost.

In all his research activities, SiewYan shown good interest and great dedication, with capability of hard working and good interactions with other researchers and working groups. My judgement on his work is good.

With my best regards

Prof. Ugo Gasparini



Padova, March 4<sup>th</sup> 2021