



**University
of Victoria**

Graduate Studies

Notice of the Final Oral Examination
for the Degree of Master of Science

of

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BSc (University of São Paulo, 2012)

“Type Ia Supernovae: Rates and Progenitors”

Department of Physics and Astronomy

Tuesday, August 25, 2015

10:00 A.M.

MacLaurin Building

Room D287

Supervisory Committee:

Dr. Christopher Pritchett, Department of Physics and Astronomy, University of Victoria (Supervisor)

Dr. Falk Herwig, Department of Physics and Astronomy, UVic (Member)

External Examiner:

Dr. Sebastien Fabbro, NRC Herzberg Institute of Astrophysics

Chair of Oral Examination:

Dr. Adam Monahan, Department of Earth and Ocean Sciences, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Thermonuclear (Type Ia) supernovae are excellent distance indicators, due to their uniform peak brightness. They are also important contributors to the chemical evolution of galaxies since their explosions supply large amounts of iron peak elements to the interstellar medium. However, there is no consensus on the progenitor systems of these supernovae. As a result, different delay times from the formation of the binary system to the supernova have been proposed. Whether the observed rate of supernova Type Ia in early-type galaxies supports a progenitor channel with one or two degenerate objects has been disputed. While the predominant old population found in early-type galaxies supports longer delay times, the presence of recent star formation might indicate the opposite. In this work, we employ a double-burst model to account for the relative contribution of both populations. We show that for a DTD / t^{-1} , convolved with star formation histories that are relevant for early-type galaxies, the supernova rate is independent of a host galaxy's colour. Our results indicate that a DTD with no cutoff is preferred, thus favoring the double-degenerate scenario.