

Dear Sir or Madam.

I hereby apply for the DARK Fellowship at Dark Cosmology Centre. I have been a graduate student at the Department of Astronomy at Stockholm University since May 2009 and I will receive my PhD degree in early 2015. My supervisors have been Jesper Sollerman and Claes Fransson, and during this time I have worked mainly with the progenitor-supernova (SN) connection, i.e. what are the progenitor stars of which core-collapse (CC) SNe. The work spans from the observational (e.g. data reduction) to the theoretical (e.g. hydrodynamical modelling), with focus on Type IIb SNe and SN 2011dh in particular (Paper I-VI).

My research and my plan to advance it are summarized in the research plan, where I discuss how hydrodynamical lightcurve modelling and multi-method studies of (CC) SN samples, as well as of individual nearby (CC) SNe, could improve our knowledge of their progenitor stars. Given the increasing amount of data obtained by surveys like the PTF and PESSTO, and the ever increasing computational speed, I think that considerable advancements in this field are possible in the near (few-years) future. It is worth noting that I have a strong interest in cosmology, and that there is many similarities (both observationally and theoretically) between CC and thermonuclear SNe, so alternative paths might be possible.

Although I have lately moved a bit towards modelling I have a deep interest in the observational side of astronomy, and I have great experience in observing and reducing data. In particular I have worked a lot with the NOT, for which I was running the Stockholm TOO program for several years. I think the quite broad experience I have can be a benefit and, if needed, I can run a complete science project (from observations to modelling) on my own. I do like collaboration, however, and during my PhD I have worked together with a large number of scientists, and in particular with the SN groups in Belfast and Padua.

Best regards,

Mattias Ergon