NCAR/CT 167

Katholieke Universiteit Leuven

Faculteit Wetenschappen
Centrum voor Plasma Astrofysica

Numerical simulation and analysis of magnetically dominated MHD bow shock flows with applications in space physics

Hans De Sterck

Proefschrift voorgelegd tot
het bekomen van de graad van
Doctor in de Wetenschappen

Promotoren:
Prof. Dr. S. Poedts
Dr. B. C. Low

MONICA: Magnetohydrodynamics Over Notoriously Incomputable Cylindrical Apparatus (T. J. Barth)

Thank you

I have really enjoyed a lot doing the work for this dissertation at the Centre for Plasma Astrophysics (CPA) in Leuven and at the High Altitude Observatory (HAO) in Boulder, and I want to thank all the people I met and interacted with at CPA and HAO.

In particular, I am much indebted to my thesis advisors Stefaan Poedts and B. C. Low, who always left me the freedom to work on what really interested me, while at the same time providing me with their expert guidance and support.

At CPA I enjoyed a nice and cosy working atmosphere for which I thank Marcel Goossens, Arnold Debosscher, Petra, Michael, Vladimir, Wouter, Hilde, Arnout, David, Peter, Robert, Balasz, Arpi, Vladimir, Ronald and the 'newer generation' that I only met occasionally after having moved to HAO.

I have also spent a few months at the FOM Institute in Nieuwegein, and I thank Hans Goedbloed, Rony Keppens and Sander Beliën for the hospitality and for the interesting and nice time spent there.

David Vanden Abeele and Herman Deconinck provided me with the von Karman multi-block code which was an invaluable starting point for the numerical work I did for my thesis. I have also had a very fruitful exchange with Gabor Tóth on numerical techniques.

During my three years in Boulder I enjoyed a working place at HAO which was at the same time very professional and very sympathetic. I thank Keith MacGregor, Art Hundhausen, Tom Holzer and Gang Lu for interesting discussions on the thesis work. Many fellow-students and postdocs became good friends, and the countless lunchtime basketball games, after-work volleyball games, the weekend hikes and dinners were welcome changes of mind and could even be counted among the sources of inspiration for this work. I thank my office-mate and brother-in-arms Chano, and my friends Rob, Cheryl, Hanli, Elain, Scott, Mausumi, Wouter, Thierry, José, Chip, Debrah, Cindy, Wayne, Graham, Colin, Colin, and many others for all of this.

When I occasionally went back to Belgium, I always got a warm welcome from Bernard, Hilke, and the whole sporex-gang, who made me feel back at home in Leuven right away.

My sisters and parents have always warmly supported me in all I wanted to do. Finally I want to thank Marina for all the support while living much of this with me.

Contents