

# Asaf Pe'er

---

CURRICULUM VITAE - September 2009

## **Personal**

**Date of Birth:** August 11, 1972

**Citizenship:** Israel

### **Contact Address:**

Space Telescope Science Institute

36700 San Martin Drive,

Baltimore, MD, 21218, USA

Tel: (1)-410-338-5055

Fax: (1)-410-338-2519

**E-mail:** [apeer@stsci.edu](mailto:apeer@stsci.edu)

**URL:** <http://www.stsci.edu/~apeer/>

## **Field of Research:**

Theoretical high energy astrophysics: Broad band emission models in compact objects; Relativistic gas dynamics; Nuclear processes; Dynamics and radiative processes in astrophysical jets, including Microquasars, active galactic nuclei (AGNs) and gamma-ray bursts (GRBs); Prompt and afterglow emission models of GRBs; Sources of high energy cosmic rays.

## **Positions:**

- 2007 - present: Riccardo Giacconi Fellow, Space Telescope Science Institute, Baltimore, MD.
- 2004 - 2007: Postdoctoral fellowship, Astronomical Institute “Anton Pannekoek”, Amsterdam, The Netherlands.
- 2005 - 2006: Long term visitor, Pennsylvania state university, University park, Pennsylvania. Host: Peter Mészáros
- 1999 - 2004: Ph.D. student, Weizmann Institute of Science, Rehovot, Israel
- 1990 - 1999: Military service. (Captain)  
Participant in “Talpiot project”, Israel. This national project selects 25 high-school graduates every year from all around Israel; The participants attend an advanced program of academic study and research. Following three years of undergraduate studies, the graduates serve additional five years as R&D officers.
- 1996-1999 Research physicist, RAFAEL, IADA. Main research topics: hydrodynamical simulations and experimental projects in chemical lasers.
- 1993-1996 Research physicist, Israeli Air Force & Israeli Aircraft Industry. Main research topics: numerical aerodynamical simulations.

## **Education:**

- 2004 Ph.D. High energy Astrophysics, Weizmann Institute of Science, Rehovot, Israel.  
Thesis subject: “The emission of radiation from Gamma Ray Bursts”  
Adviser: Prof. Eli Waxman
- 1999 M.Sc. in Physics, Weizmann Institute of Science, Rehovot, Israel.  
Thesis subject: “Optically stimulated chemical HBr laser - summary of simulation and spontaneous emission experiments”  
Advisers: Prof. Moshe Shapiro, Weizmann Institute of Science; Dr. Yehuda Nachshon, IADA; Prof. Uri Oppenheim, Technion.
- 1993 B.Sc. in Physics and Mathematics (Talpiot program), The Hebrew University of Jerusalem, Israel.

## **Honors and Awards**

- 2007 The Riccardo Giacconi fellowship award, STScI
- 1990 Participant in “Talpiot Project”, Israel

## **Grants**

- 2009 Fermi cycle 2 proposal #21267 (P.I., \$70.000)
- 2009 Fermi cycle 2 proposal #21035 (Co.I., \$80.000)

### **Graduate student supervision**

Between 2006- 2007 I was involved in the supervision of the Ph.D. student Hylke Koers (his Ph.D. supervisors were prof. Karel Gaemers and prof. Ralph Wijers) and the Ph.D. student Jacob Frederiksen (a visiting student from Stockholm).

I will shortly be involved in the supervision of the Ph.D. student Michael Burgess (a visiting student from UAH).

### **Teaching Assistantship**

2002: “Topology and Geometry for physicists” (Prof. M. Milgrom)

1999: “High energy astrophysics” (Prof. E. Waxman)

### **Service**

Referee for the Astrophysical Journal, Monthly Notices of the Royal Astronomical Society and Astronomy and Astrophysics.

Participate in APS white paper “The future of ground-based gamma-ray astronomy”

Participated in the local organization committee of “070228: The next decade of GRB afterglows” conference (Amsterdam, March 2007)

## **Talks and Colloquia**

### **Invited talks**

1. "Radio Quite AGN's as possible sources of ultra-high energy cosmic rays" to be given in "Nonlinear Processes in Astrophysical Plasmas: Particle Acceleration, Magnetic Field Amplification, and Radiation Signatures", KITP, Santa Barbara, CA (October 2009)
2. "Thermal emission in GRB prompt emission phase", to be given in "The shocking universe: gamma ray bursts and high energy shock phenomena", Venice, Italy (Sep. 2009)
3. "The effect of a photospheric emission on GRB spectra", in "Physics of relativistic flows: An observational view" Stockholm, Sweden (June 2009)
4. "Radiative processes in GRB prompt emission", in "KIAA program on GRB Physics", Kavli Institute for Astronomy and Astrophysics (KIAA) in Peking University, Beijing, China (May 2009)
5. "Thermal emission in Gamma-ray bursts", 2009 Hubble Fellows Symposium, STScI, Baltimore, MD (March 2009)
6. "Temporal evolution of thermal emission in GRB prompt emission phase", 2008 Nanjing GRB conference, Nanjing, China (June 2008)
7. "The observable effects of a photospheric component on GRBs and XRFs prompt emission spectrum", GRB mini-symposium, Stockholm, Sweden (Sep. 2006)
8. "The physics of GRB prompt emission", GRB RTN school, Santorini, Greece (Sep. 2005)

### **Department Colloquia**

9. "Gamma-ray bursts: past, present and future", to be given in UNT, Texas (Oct. 2009)
10. "A model for emission from Jets in X-ray Binaries: Consequences of a single acceleration episode", UNLV, Las Vegas, Nevada (Jan. 2009)
11. "Thermal emission in GRB's", NASA Goddard space flight center, Washington, DC (Oct. 2008)
12. "Open questions in the study of Gamma-Ray Bursts", Virginia Tech, VA (Aug. 2008)

13. “Temporal evolution of thermal emission in GRB’s “, IUCAA, Pune, India (September 2007)
14. “Analysis of the thermal emission component in GRBs”, Prague, Czech republic (May 2007)
15. “The observable effect of a photospheric component on GRBs prompt emission spectrum: peak energy clustering and flat spectra above the thermal peak”, UNLV, Las Vegas, Nevada (Feb. 2006)
16. “The Signature of a wind reverse shock in GRB afterglows”, KITP, Santa Barbara, California (Jan. 2006)
17. “Peak energy clustering and efficiency in compact objects”, PSU, State College, Pennsylvania (Nov. 2005)
18. “High energy photon emission in the early afterglow of GRBs”, MPA, Garching, Germany (Jan. 2005)

### **Contributed talks**

19. “Theoretical implications of thermal emission from GRBs”, in “Gamma Ray Bursts symposium 2008”, Huntsville, AL (Oct. 2008)
20. “Analysis of the thermal emission component in GRBs”, in “070228: The next decade of GRB afterglows”, Amsterdam, the Netherlands (March 2007)
21. ”The observable effects of a photospheric component on GRBs prompt emission spectrum”, Royal Society Gamma-ray burst discussion meeting, London, UK (Sep. 2006)
22. “The Signature of a wind reverse shock in GRB afterglows”, in ”Swift and GRBs: Unveiling the Relativistic Universe”, Venice, Italy (June 2006)
23. “Prompt GRB spectrum: detailed calculations and the effect of pair production”, GRB- RTN meeting, Padova, Italy (Apr. 2004)
24. “The effect of pairs on GRB prompt emission spectra”, International School on astroparticle physics, Conca Specchiulla, Italy (July 2003)
25. “High energy photons and neutrino emission in the early afterglow of GRBs”, Frontiers in particle astrophysics and cosmology, München, Germany (Oct. 2001)

### Additional

26. Since 2004, ~5 seminars a year on various topics in universities around the world.
27. Public outreach talks: “The measure of cosmological distances”, August 2008; “Life and death of stars”, July 2004.

### Press releases

The following articles which refer to my works appeared in popular science magazines:

- “Gamma-Ray Burst Afterglows Brighter Than Expected” by JR Minkel, appeared in Scientific American on July 8th, 2008. See <http://www.scientificamerican.com/article.cfm?id=gamma-ray-burst-afterglow>
- “Mysterious gamma-ray bursts continue to surprise” by Bill Andrews, appeared in “Astronomy.com” blog on July 24th 2009. See <http://cs.astronomy.com/asycs/blogs/astronomy/2009/07/24/mysterious-gamma-ray-bursts-continue-to-surprise.aspx>

## Publication List - Asaf Pe'er

### Refereed journal papers

1. **Pe'er, A.**, Murase, K., & Mészáros, P. “*Radio Quiet AGNs as possible Sources of Ultra-high Energy Cosmic Rays*”, 2009, Phys. Rev. D., submitted
2. Casella, P., **Pe'er, A.** “*On the Role of the Magnetic Field on Jet Emission in X-Ray Binaries*”, 2009, ApJ., 703, L63 (arXiv:0908.2129)
3. Zhang, B., **Pe'er, A.** “*Evidence of a Non-Baryonic Composition in GRB 080916C*”, 2009, ApJ., 700, L65 (arXiv:0904.2943)
4. **Pe'er, A.**, & Casella, P. “*A Model for Emission from Jets in X-ray Binaries: Consequences of a Single Acceleration Episode*”, 2009, ApJ, 699, 1919 (arXiv:0902.2892)
5. Ryde, F., & **Pe'er, A.**, “*Quasi-Blackbody Component and Radiative Efficiency of the Prompt Emission of Gamma-Ray Bursts*”, 2009, ApJ, 702, 1211 (arXiv:0811.4135)
6. Nysewander, M., Fruchter, A., & **Pe'er, A.**, “*A Comparison of the Afterglow of Short- and Long- Duration Gamma Ray Bursts*”, 2009, ApJ, 701, 824 (arXiv:0806.3607)
7. **Pe'er, A.**, “*Temporal Evolution of Thermal Emission from Relativistically Expanding Plasma*”, 2008, ApJ, 682, 436 (arXiv:0802.0725)
8. **Pe'er, A.**, Ryde, F., Wijers, R.A.M.J., Mészáros, P., & Rees, M.J., “*A new method of determining the initial size and Lorentz factor of Gamma-Ray Burst fireballs using a thermal emission component*”, 2007, ApJ, 664, L1 (astro-ph/0703734)
9. Koers, H.B.J., **Pe'er, A.**, & Wijers, R.A.M.J., “*Parametrization of secondary Pions and Kaons produced in energetic proton-proton collision*”, 2007, ApJ, submitted (hep-ph/0611219)
10. **Pe'er, A.**, & Zhang, B., “*Synchrotron emission in small scale magnetic field as possible explanation for prompt emission spectra of GRB's*”, 2006, ApJ, 653, 454 (astro-ph/0605641)
11. **Pe'er, A.**, Mészáros, P., & Rees, M.J., “*Radiation from an expanding cocoon as an explanation of the steep decay observed in GRB early afterglow light curves*”, 2006, ApJ, 652, 482 (astro-ph/0603343)

12. Pe'er, A., & Wijers, R.A.M.J., “*The signature of a wind reverse shock in Gamma-Ray Bursts afterglows*”, 2006, ApJ, 643, 1036 (astro-ph/0511508)
13. Pe'er, A., Mészáros, P., & Rees, M.J., “*The observable effects of a photospheric component on GRB’s and XRF’s prompt emission spectrum*”, 2006, ApJ, 642, 995 (astro-ph/0510114)
14. Pe'er, A., Mészáros, P., & Rees, M.J., “*Peak energy clustering and efficiency in compact objects*”, 2005, ApJ, 635, 476 (astro-ph/0504346)
15. Pe'er, A., & Waxman, E., “*High energy photons emission in the early afterglow of GRB’s*”, 2005, ApJ, 633, 1018; ERRATUM, ApJ, 638, 1187 (astro-ph/0407084)
16. Pe'er, A., & Waxman, E., “*Time dependent numerical model for the emission of radiation from relativistic plasma*”, 2005, ApJ, 628, 857 (astro-ph/0409539)
17. Pe'er, A., & Waxman, E., “*Prompt GRB spectra: detailed calculations and the effect of pair production*”, 2004, ApJ, 613, 448 (astro-ph/0311252)
18. Pe'er, A., & Waxman, E., “*The high energy tail of Gamma-Ray Burst 941017: Comptonization of synchrotron-self absorbed photons*”, 2004, ApJ, 603, L1 (astro-ph/0310836)
19. Pe'er, A., Shapiro, M., & Balint-Kurti, J.J., “*The breaking of the backward-forward symmetry in the angular distribution of  $m_j$ -selected photofragmentations*”, 1999, Journal of Chem. Phys., 110, 11928

### Conference Proceedings

20. Pe'er, A., & Ryde, F., “*Theoretical Implications of Thermal Emission from Gamma-Ray Bursts*”, 2009, Proc. of the 6th Huntsville Gamma-Ray Burst symposium 2008, Huntsville, Al, Oct. 2008
21. Ryde, F., & Pe'er, A., “*Behavior of Thermal Emission in Gamma-Ray Bursts*”, 2009, Proc. of the 6th Huntsville Gamma-Ray Burst symposium 2008, Huntsville, Al, Oct. 2008
22. Stamatikos, M., et. al. (including A. Pe'er), “*The Correlation of Spectral Lag Evolution with Prompt Optical Emission in GRB 080319B*”, 2009, Proc. of the 6th Huntsville Gamma-Ray Burst symposium 2008, Huntsville, Al, Oct. 2008 (arXiv:0902.0263)

23. Pe'er, A., “*Thermal emission from Gamma-Ray bursts*”, 2008, Proc. of “2008 Nanjing GRB conference”, Nanjing, China, June 2008 (arXiv:0809.0903)
24. Falcone, A.D., et. al. (including A. Pe'er), “*The Gamma Ray Burst section of the White Paper on the Status and Future of Very High Energy Gamma Ray Astronomy: A Brief Preliminary Report*”, 2007, Proc. of “Gamma Ray Bursts 2007”, Santa Fe, NM, Nov. 2007 (arXiv:0804.2256)
25. Graham, J.F., et. al. (including A. Pe'er), “*GRB 070714B - Discovery of the Highest Spectroscopically Confirmed Short Burst Redshift*”, 2007, Proc. of “Gamma Ray Bursts 2007”, Santa Fe, NM, Nov. 2007 (arXiv:0802.1346)
26. Pe'er, A., Ryde, F., Wijers, R.A.M.J., Mészáros, P., & Rees, M.J., “*Analysis of the thermal emission component in GRBs*”, 2007, Proc. of “070228: The next decade of GRB afterglows”, New Astronomy reviews
27. Pe'er, A., Mészáros, P., & Rees, M.J., “*GRBs prompt emission spectrum: an analysis of a photosphere model*”, 2006, Proc. of the royal society discussion meeting on “Recent developments in the study of Gamma Ray Bursts”, published in the Gamma Ray Bursts issue of Phil Trans A. London, September 06
28. Pe'er, A., & Wijers, R.A.M.J., “*The signature of a wind reverse shock in the early afterglow of GRB's*”, 2006, Proc. of “Swift and GRBs: Unveiling the Relativistic Universe”, Venice, Italy, June 06
29. Pe'er, A., Mészáros, P., & Rees, M.J., “*The observable effect of a photospheric component on GRBs prompt emission spectrum: peak energy clustering and flat spectra above the thermal peak*”, 2006, Proc. of “Gamma Ray Bursts in the Swift Era”, 16th Annual Astrophysics Conference in Maryland, Nov. 05

### Others

30. Williams, D.A., et. al. (including A. Pe'er), “*What Are Gamma-Ray Bursts? The Unique Role of Very High Energy Gamma-Ray Observations*”, 2009, a “white paper” submitted to the Astro2010 decadal review.
31. Falcone, A.D., et. al. (including A. Pe'er), “*Gamma Ray Burst Section of the White Paper on the Status and Future of Ground-based TeV Gamma-ray Astronomy*”, 2008, report from the Gamma Ray Burst Working group of the APS commissioned White paper on ground-based TeV gamma ray astronomy (arXiv:0810.0520)

**GCN circulations**

32. Graham, J.F., et. al. (including A. Pe'er), “*GRB 070714B: host galaxy spectroscopic redshift*”, 2007, GRB Coordinates Network, Circular Service, 6836, 1