

# CURRICULUM VITAE

**Amin Esmaeili<sup>1</sup>**

**Nationality: Iranian**

**Birthday: 1981/09/19(38)**

**Married**



## Undergraduate & graduate level

**Education** 1999 – 2004, BSC in physics department (Atomic physics) Shiraz University ,Shiraz, Iran  
GPA: 14.94/20 (1<sup>st</sup> rank in some specific courses)

2004 – 2007, MSC in Nuclear Engineering (Fusion)  
, Tehran Polytechnic (Amirkabir University of Tech.)  
GPA: 16.08/20 (2<sup>nd</sup> rank among graduates)

2010 - 2015, PhD in Space plasma physics, Tsukuba Univ.,  
Japan

## Interests

Object oriented programming (C/C++/Python)  
Computer graphics (OpenCV: edge detection, CAD formats)  
Space Plasma Simulation (PIC and fluid)  
Parallel computing and programming (OpenMP, MPI, OpenAC)  
3D Global PIC Plasma simulation  
FDTD, Ns-FDTD

## Final Project

BSC: Investigation of the correlation between  
electrons in many electron atoms in the view  
of quantum mechanics.

MSC: Analysis and investigation of supersonic  
jet injection into tokomaks with  
Direct Simulation Monte Carlo (DSMC)  
Method

PhD: Large Scale 3D Electro-Magnetic Global  
Particle-In-Cell Simulation for Magnetosphere  
Focusing on CUSP Dynamics in Northward  
IMF

## Publication list:

### Refereed Journal Publication

(1). Self-consistent hot spot tracing In kinetic simulation: a successive method to  
improve the test particles method, 2014, The Open Plasma Phys. Journal  
Amin Esmaeili, P194-198

---

<sup>1</sup> Tel: +98917 731 3926

E-mail: amin.esmaeili0002@gmail.com, amin@cavelab.cs.tsukuba.ac.jp

- (2). High-altitude cusp dynamics dependence on IMF direction: mainly focused on southward IMF, (Accepted), IEEE, transactions on plasma science  
A. ESMAEIL , D.S. CAI, B. LEMBEGE and K. NISHIKAWA
- (3). Cusp dynamics under northward IMF using three-dimensional global particle-in-cell simulations, *J. of Gephys. Res., Space Physics*, 120, doi:10.1002/2015JA021230  
D.S. CAI, A. ESMAEIL , B. LEMBEGE and K. NISHIKAWA
- (4). New functions and graphical user interface attached to powder indexing software CONOGRAPH, *J. Appl. Cryst.* (2017). 50, 651-659, doi:10.1107/S1600576717001145  
A. Esmaeili, T Kamiyama, R. Oishi-Tomiyasi
- (5). PIC Numerical Simulation on the Characteristics of Alfvénic Transition Layer under different IMF conditions, submitted to (under revision) the *Journal of Advances in Space Physics*, Amin Esmaeili, M. J. Kalae
- (6). Double cusp simulation during Northward IMF using 3D PIC global code, *Astrophysics and Space Science*, July 2017, 362:125, DOI: 10.1007/s10509-017-3098-8 , Amin Esmaeili, M. J. Kalae
- (7). A Comparative study of Alfvénic transition layer from 3D PIC simulation with Cluster experimental data, under southward IMF case (2017), *Iranian Journal of Earth and Space Research*, Amin Esmaeili, M. J. Kalae (In Farsi)  
**Article 6, Volume 43, Issue 3, Autumn 2017, Page 531-537**  
DOI: 10.22059/JESPHYS.2016.59131
- (8). Self-Consistent hot spot tracing by kinetic simulations: With the emphasis on Cusp particle entry (2017) *Iranian Journal of Earth and Space Physics*, Amin Esmaeili, M. J. Kalae, **Article 8, Volume 42, Issue 4, Winter 2017, Page 73-79,**  
DOI: 10.22059/JESPHYS.2016.60291
- (9). Particle precipitation to the cusp via ATL during Northward IMF and its application to the satellite data,(2018), submitted to the *J. of Gephys. Res., Space Physics*  
D.S. CAI , B. LEMBEGE , A. ESMAEIL and K. NISHIKAWA
- (10). 3D particle simulation of Dipolarization front during southward IMF,(2018), submitted to the *J. of Gephys. Res., Space Physics*  
D.S. CAI , B. LEMBEGE , A. ESMAEIL and K. NISHIKAWA
- (11). Kármán Vortex Street and Strouhal Number in 3D global MHD simulations in Northward IMF,(2019), submitted to *The Astrophysical Journal(APJ)*  
D. Cai, Y. Kubota, S. Fujita, B. Lembège, Y. Jiang, H. Hasegawa, Amin Esmaeili and T. K. M. Nakamura
- (12). 3D global PIC simulation of Alfvén Mach number effects on the magnetosphere dynamics under mostly northward IMF condition,(2019), submitted to *Phys. Of Plasma*  
Amin Esmaeili\*
- (13). A simulation study of penetration and distribution of charged particles in the plasmasphere based on their initial energy,(2020), submitted to *Astrophysics and Space Science*, Amin Esmaeili\*, M. J. Kalae

- (14). A two-dimensional Weibel instability simulation using the non-extensive distribution function,(2020), submitted to Physics of Plasmas, Amin Esmaeili\*, M. Ikram, A. Mushtaq, A. A. Abid
- (15). MHD waves with Landau diamagnetic pressure and Pauli paramagnetism in degenerate plasmas, ,(2020), submitted to Physica Scripta B, Ali, Safdar; Ahmad, Mushtaq; Esmaeili, Amin; Ikram Safi, Muhammad

### **Refereed Conference Publication**

- (1). DongSheng Cai; Amin Esmaeili; Bertrand Lembege; Ken-Ichi Nishikawa, “A large scale 3D global full particle simulation of the solar wind-terrestrial magnetosphere interaction: Impact of the IMF rotation on the magnetospheric cusp dynamics”, General Assembly and Scientific Symposium (URSI GASS), 2014 XXXIth URSI, DOI:, 10.1109/URSIGASS.2014.6929906  
Publication Year: 2014 , page(s): 1 – 4  
IEEE Conference Publications
- (2). DongSheng Cai; Amin Esmaeili; Bertrand Lembege; Ken-Ichi Nishikawa, “3D Global Particle-In-Cell Simulation: Northward Case focusing on Cusp region in Northern Hemisphere”, The 11th International School for Space Simulations (ISSS-11) DVD, (Solicited and Invited), (20130721)
- (3). Amin Esmaeili; S. NourAzar; A. Ganjaei “Simulation of supersonic jet injection into tokamaks with Direct Simulation Monte Carlo (DSMC) method”, 28<sup>th</sup> ICPIG(International Conference on Phenomena of Ionized Gas), 2007
- (4). M. Molaei; Amin Esmaeili  
“Analysis of stresses in ITER Divertor with the uses of ANSYS Software, Iran Nuclear Conference, (www.nsi.ir), 2006

### **Refereed Conference Presentation**

- 2019, Impact of the IMF rotation on the dynamics of the Alfvén Transition Layer : 3D PIC global simulation of the solar wind–terrestrial magnetosphere interaction, EGU2019  
D.S. CAI, A. ESMAEIL, B. LEMBEGE and K. NISHIKAWA
- 2018, Impact of the IMF Rotation on the depolarization front : 3D Full Particle Simulations of the Solar Wind-Terrestrial Magnetosphere Interactions, EGU2018  
D.S. CAI, B. LEMBEGE, A. ESMAEIL and K. NISHIKAWA
- 2017, 3D Full particle simulations of the solar wind-terrestrial magnetosphere interaction: impact of the IMF rotation on the dipolarization process of magnetospheric dynamics, AGU fall meeting, New Orleans, USA (**ORAL**)  
D.S. CAI, B. LEMBEGE, K. NISHIKAWA and A. ESMAEIL
- 2015, Particles momenta through the Alfvén transition layer of the cusp region : 3D global particle-in-cell simulations, EGU2015  
D.S. CAI, B. LEMBEGE, A. ESMAEIL and K. NISHIKAWA
- 2014, Analysis of the Alfvén transition layer in the cusp region by the use of 3D global particle-in-cell simulations, AGU fall meeting, San Francisco, USA  
D.S. CAI, B. LEMBEGE, A. ESMAEIL and K. NISHIKAWA

2014, 3D Global PIC Simulation of Cusp Dynamics and Alfvénic Transition Layers at Cusp Outer Boundary During IMF Rotations from North to South, AOGS 2014, Sapporo, Japan  
D.S. CAI, A. ESMAEIL , B. LEMBEGE and K. NISHIKAWA

2013, 3D Global Particle-In-Cell Simulation: Northward Case focusing on Cusp region in Northern Hemisphere, ISSS11,(**ORAL**)  
D.S. CAI, A. ESMAEIL , B. LEMBEGE and K. NISHIKAWA

2013, Large-scale Global 3D Full Particle Simulations of the Solar Wind-Terrestrial Magnetosphere Interaction, AOGS 2013  
DongSheng Cai; Bertrand Lembege; Ken-Ichi Nishikawa; Amin Esmaeili

2013, Analysis of the Alfvénic transition layer at the outer boundary of the cusp: 3D large scale PIC simulation, EGU2013-5444 (**ORAL**)  
DongSheng Cai; Bertrand Lembege; Amin Esmaeili; Ken-Ichi Nishikawa

2012, Dynamics of the cusp boundaries and particle entry during a Northward IMF period: 3-D PIC large scale simulation, ICNS 2012 (**ORAL**)  
Bertrand Lembege; DongSheng Cai; Amin Esmaeili; Ken-Ichi Nishikawa

2012. Dynamics of the cusp boundaries and particle entry during a Northward IMF period: 3-D PIC large scale simulation, AGU 2012  
DongSheng Cai; Bertrand Lembege; Ken-Ichi Nishikawa; Amin Esmaeili

2012, Dynamics of the cusp boundaries and particle entry during a Northward IMF period: 3-D PIC large scale simulation, EGU2012-8044  
DongSheng Cai; Bertrand Lembege; Amin Esmaeili; Ken-Ichi Nishikawa

2011, Cusp Dynamics during the IMF rotation from Northward to Southward: 3-D PIC large scale simulation, AOGS 2011  
DongSheng Cai; Bertrand Lembege; Amin Esmaeili; Ken-Ichi Nishikawa

2011, Deformation of the cusp boundary during the IMF rotation From Northward to Southward : 3-D PIC large scale simulation , EGU2011, -  
DongSheng Cai; Bertrand Lembege; Amin Esmaeili; Ken-Ichi Nishikawa

2011, Dynamics of particle entries within the cusp boundary deformed during the IMF rotation from Northward to Dawn-Dusk, AGU 2011  
DongSheng Cai; Bertrand Lembege; Amin Esmaeili; Ken-Ichi Nishikawa

2011, Magnetic Reconnection in Magnetosphere analyzed by Field Topology: Application to the Magnetotail and Subsolar Region, EARTH-SUN SYSTEM EXPLORATION (ESSE),11, April 2011 (**ORAL**)  
DongSheng Cai; Bertrand Lembege; Amin Esmaeili; Ken-Ichi Nishikawa

2011, Suggestion of a structural design for ICF pellets in order to reduce fluid instabilities, IEEE ICOPS- SOFE11、 June, 26-30, 2011, Chicago, Illinois  
Amin Esmaeili; DongSheng Cai

2010, Progress In Modeling Kinetic-Global Coupling In Space Weather, American Geophysical Union (AGU) 2010 Fall Meeting  
DongSheng Cai; Bertrand Lembege; Ken-Ichi Nishikawa; Amin Esmaeili

2009, Numerical Investigation of Temporal Evolution of Perturbed Interface between Two Ideal Fluids in 3 Dimensional, Spherical Geometry, 4<sup>th</sup> IAEA- TM, accepted  
Amin Esmaeili; M. Rezvanijalal; Ali Sirusi

2008, Numerical Investigation of Temporal Evolution of Perturbed Interface between Two Ideal Magnetized , Plasmas, Institute of physics of Iran  
Amin Esmaeili; M. Rezvanijalal; Ali Sirusi

2007, Simulation of supersonic jet injection into tokamaks with Direct Simulation Monte Carlo (DSMC) method, 28<sup>th</sup> ICPIG(International Conference on Phenomena of Ionized Gas), 2007  
Amin Esmaeili; S. NourAzar; A. ganjaei

2006, Analysis of stresses in ITER Divertor with the uses of ANSYS Software, Iran Nuclear Conference, ([www.nsi.ir](http://www.nsi.ir))  
M. Molaee; Amin Esmaeili

### **Practical**

#### **Experiences**

- 2005 Simple modeling of a two group two region reactor
- 2007 Modelling of two-stream instability with PIC Method
- 2014 Contribution in developing space group software at KEK for Crystallography

### **Computer Skills**

#### **Expertise:**

Windows, Microsoft Office, C++, Visual Basic, Python, Mayavi, IDL, OpenMPI, Spedas, Visual Fortran, Techplot, Linux...

#### **Not Expertise:**

MATLAB (7.0)

### **High School**

1995-1998, Zolghadr high school, Physic & Mathematics, Fasa Fars, Iran

1998-1999, Shahid Beheshti high school, Physic & Mathematics, Fasa, Fars, Iran

### **Honors & Awards:**

Member of Elites Association of Iran

Privilege for free education with rank of 13 out of 15000 participants in Graduate National Entrance Exam held by The Educational Measurement and Evaluation Organization of Iran (EMEO), Feb 2004, Iran

Privilege for free education with rank of 5500 out of 350000 participants in Undergraduate National Entrance Exam held by The Educational Measurement and Evaluation Organization of Iran (EMEO), July 1999, Iran

Honored as the second rank among the graduate students, Amirkabir University of Technology

Privilege for Nikki/Saneyoushi scholarship 2010-2013

Privilege for Jasso scholarship, 2014 -2015

Privilege for RA and TA from 2010- 2015

**Workshops**

- 1- MPI workshop, Toyo Univ., fall 2011
- 2 - MPI workshop, Intel (Tokyo), fall 2012
- 3 -11th International School/Symposium for Space Simulations, ISSS-11, China, July 2013

**Experience:**

- 1- Lecturer, Univ. of Applied Sci. and Tech, 2006-2009, Different basic courses (Physics)
- 2- Teaching of Optics laboratory at the University of Applied science & Technology of Iran, fall 2006
- 3-Teaching assistant, Univ. of Tsukuba, Tsukuba, Japan, April, 2010 – March, 2015
- 4-Research assistant, Univ. of Tsukuba, Tsukuba, Japan, April, 2010 – March, 2015
- 5- Research assistant, KEK (High Energy Accelerator Research Organization, Tsukuba, Japan, Crystallography space group simulation, Jan, 2015 – Oct., 2015
- 6- PostDoc., Institute of Geophys., Tehran Univ., Solar-Trestrial simulation, April, 2016 – April 2017
- 7- JST Researcher, Yamagata Univ., Japan, EBSD simulation, May, 2017 – March 2019
- 8- Project cooperation with Tehran Univ on space plasma simulation, April 2019-present
- 9- Part time lecturer, Yazd Univ, Sept 2019-present
- 10- Project Cooperation with Or-Tec Company, Tsukuba, Japan, OpenCV, CAD formats: STEP, GDSII, Parasolid, DXF, GO Lang, FDTD, edge extraction, March 2018- Present

**Active Collaborations:**

- 1- Univ. of Tsukuba: solar-terrestrial simulation
- 2- KIS(Kiepenheuer Institute for Solar Physics), Germany: data analysis for Sun's Chromosphere research

**Research grants:**

2013: research grant for double cusp simulation, granted to our group to cooperate with ISSI, UCLA, USA  
May 2013: 1500USD, research fund for EGU2013 attendance, Austria  
2016-2017: 7000USD, research grant, Elites association of Iran  
2016-2017:1500USD, laboratory research usage grant, Elites association of Iran  
2016-2017: 3000USD, Travel research grant, Elites association of Iran  
8 Dec. -14 Dec., 2019: Travel fund for a week research visit to KIS, Germany

**TOEFL(iBT):** R:26 L:27 S:15 W:20 T:88

**Japanese Language:** Speaking and listening (average),  
Reading and Writing (little)

**Hobbies:** Theater (Acting, directing), Playing music (Nei), Swimming