

Kratek opis usposabljanja mladega raziskovalca (*Short description of the Young Researcher's training*)1. Raziskovalna organizacija (*Research organisation*):

Univerza v Ljubljani, Fakulteta za matematiko in fiziko, Jadranska 19, 1000 Ljubljana
University of Ljubljana, Faculty of Mathematics and Physics, Jadranska 19, 1000 Ljubljana

2. Ime, priimek in elektronski naslov mentorja (*Mentor's name, surname and email*):

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3. Šifra in naziv raziskovalnega področja (*Research field*):

1.02.03 Naravoslovno-matematične vede / Fizika / Astronomija (Astronomy)

4. Kratek opis usposabljanja mladega raziskovalca (*Short description of the Young Researcher's training*):

Navedite tudi morebitne druge zahteve, vezane na usposabljanje mladega raziskovalca (npr. znanje angleškega jezika, izkušnje z laboratorijskim delom, potrebne licence za usposabljanje...).

slab:

Področje raziskav je astrofizika, oziroma bolj specifično galaktična arheologija, ki z raziskavami strukture, razvoja in nastanka naše Galaksije kot ene od tipičnih galaksij v vesolju predstavlja alternativo kozmologiji, ki raziskuje oddaljene objekte. Galaktično arheologijo zato včasih imenujejo tudi lokalna kozmologija. Ljubljanska skupina ima za take raziskave izvrstne možnosti. Že 17 let sodelujemo v projektu Gaia Evropske vesolske agencije, ki je pred mesecem dni objavil revolucionarno javno objavo podatkov, ki med drugim vključuje oddaljenosti in gibanje 1,4 milijarde zvezd v naši Galaksiji. Smo tudi jedrni del treh velikih projektov v Avstraliji in Čilu (www.galah-survey.org, www.rave-survey.org, www.gaia-eso.eu), ki s spektroskopskimi meritvami točnih radialnih hitrosti in kemične zastopanosti do 30 kemičnih elementov v zvezdnih atmosferah nadgrajujejo rezultate misije Gaia, posamezne zanimive objekte pa je mogoče dodatno opazovati tudi na observatorijih v Italiji in Avstraliji. Dostop do še neobjavljenih podatkov teh projektov nam omogoča tudi študij posebnih tipov zvezd, ki predstavljajo kratkožive faze zvezdne evolucije, zvezd v posebnih okoljih, kot so zvezde s (tudi Zemlji podobnimi) planeti, dvojne in večkratne zvezde, in nenazadnje študij lastnosti prahu, plina in zapletenih molekul v medzvezdnem prostoru.

Od kandidat/ke pričakujemo dobro znanje fizike in osnov numeričnega reševanja problemov, po možnosti seznanjenost s področjem astrofizike. Delo vključuje tudi iskanje novih pristopov v interpretaciji podatkov in v avtomatizaciji tega procesa z uporabo metod umetne inteligence, kjer pa je bolj od predznanja pomembno veselje do odkrivanja novega. Kandidat/ka bo deloval/a v zagnani, neformalni lokalni in mednarodni skupini, kakršne so danes značilne za prebojne astrofizikalne raziskave. Po dosedanjih izkušnjah lahko domnevamo, da bodo znanstveni rezultati in izkušnje, pridobljene med študijem, kandidatu/ki omogočili nadaljnjo znanstveno kariero na tem področju, obenem pa bo tudi izjemno usposobljen/a na širšem področju umetne inteligence.

eng:

Proposed research is within the field of astrophysics. It focuses on galactic archaeology which studies the structure, evolution and formation of our Galaxy as one of the typical galaxies in the Universe and presents an alternative to cosmology which is studying very distant objects. For this reason galactic archaeology may be referred to as local cosmology. Our group has been in excellent position to do this type of research. We are part of the Gaia project of the European Space Agency for 17 years, and a month ago we contributed to its revolutionary public data release which includes distances and motions of 1,4 billion of stars in the Galaxy. We are also one of the core teams of large international collaborations conducting massive ground-based spectroscopic surveys from Australia and Chile (www.galah-survey.org, www.rave-survey.org, www.gaia-eso.eu). Exact radial velocities and chemical abundances of up to 30 elements, which are being obtained from these data, are bringing the Gaia results to the new level. There are also proven paths to obtain additional measurements of specific objects at observatories in Italy and Australia. Access to data which are still in the quality control phase and detailed knowledge of data reduction allows us to study objects of special interest which are representative of short phases of stellar evolution, of stars in specific environments, such as stars with (Earth-like) planets, binary and multiple stars, and - not the least - to study presence and properties of dust, gas, as well as complicated molecules in the space between stars.

The candidate is expected to have a good knowledge of physics and of basics of numerical problem solving, basic knowledge of the field of astrophysics is an advantage. The work includes the search for new ways of data interpretation and for automation of this process with artificial intelligence approaches - but in this case no prior knowledge is expected. It is important that the candidate is driven to discover new knowledge, a goal which will be pursued as part of an enthusiastic and informal local and international teams, a typical situation for modern frontline research in astrophysics. Driving from current experience it can be judged that results and experience obtained during the PhD studies will lead to a future scientific career in the same field, with an extra bonus of having a demonstrated knowledge and experience in methods of artificial intelligence.

