| PI Name: Clark, Noel A. Ph.D. Project Title: Ferromagnetic Liquid Crystal Colloids in Microgravity Division Name: Physical Sciences Program/Discipline: CoMPLEX FLUIDS/SOFT MATTERComplex Fluids Joint Agency Name: CoMPLEX FLUIDS/SOFT MATTERComplex Fluids Joint Agency Name: No Human Research Program Elemett None Human Research Program Riskes None Space Biology Element: None Space Biology Special Category: None PI Email: noel clark@colorado.edu PI Email: Nole PI Crganization Type: UNIVERSITY Pisos Department, CB390 Phone: 303-941-1008 PI Address 1: Physics Department, CB390 | | | | |
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| Organization Name:University of ColoradoP1 Address 1:Physics Department, CB390P1 Address 2:2000 Colorado AveP1 Web Page:StateCity:BoulderStateCongressional DistrictZip Code:80309-0001Comments:Solicitation / FundingProject Type:FlightSolicitation / FundingSolicitation / FundingStar Date:1200/2016No. of Post Docs:Iterational Space StationNo. of Bachelor's Candidates:Iterational Space StationNo. of Bachelor's Candidates:No. of Master' Degress:No. of Bachelor's Candidates:No. of Master' Degress:State TampingIterational Space StationContact Email:Bachelan Timogree masa govFlight Assignment:SSKey Personnel Change/Previues JContand Infinition:Glaser, Mathew Ph.D. (University of Colorado, Boulder) State, Cheol MS. (University of Colorado, Boulder) Park, Cheol MS. (University of Colorado, Boulder) <b< td=""><td>PI Email:</td><td>noel.clark@colorado.edu</td><td>Fax:</td><td>FY</td></b<> | PI Email: | noel.clark@colorado.edu | Fax: | FY |
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| Pi Address 2:2000 Colorado AvePi Web Page:ECity:BoulderStat:City:BoulderCongressional Districi2] Comments:2Project Type:FlightSolicitation / Funding Source:2015 NNH15ZTP002N MaterialsLab Open Science Commaniss for Experiments on the International Space StationStart Date:12/02/2016End Date:12/01/201No. of Post Does:No. of Master' Degress:12/01/201No. of Post Does:No. of Master' Degress:12/01/201No. of Master's Candidates:No. of Master' Degress:12/01/201No. of Master's Candidates:No. of Master' Degress:12/01/201Contact Monitor:Tin PadethaContact Phone:216433-8164Contact Email:Pedetha Tin/Greer.nasa.gov16/433-8164Flight Assignment:Iss12/01/20112/01/201Col Name (Institution):Glaser, Matthew Ph.D. (University of Colorado, Boulder) Shaai, Min Ph.D. (University of Colorado, Boulder) | Organization Name: | University of Colorado | | |
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| Zip Code:80309-0001Congressional District:2Zip Code:80309-0001Congressional District:2Comments:2015 NNH15ZTT002N MaterialsLab Open Science Campaigns for Experiments on the International Space StationProject Type:lightSolicitation / Funding Soluce:2015 NNH15ZTT002N MaterialsLab Open Science Campaigns for Experiments on the International Space StationStart Date:1202/2016End Date:12/01/2021No. of PhD Doegres:I2/01/2021I2/01/2021No. of PhD Candidates:No. of Master' Degres:I2/01/2021No. of Master's Candidates:No. of Bachelor's Degrees:I2/01/2021No. of Bachelor's Candidates:Monitoring Cente:NASA GRCContact Monitor:In. PadethaContact Phone:I2/04/2021Contact Email:Padetha. Tin/@gree.nasa.govI2/04/2021I2/04/2021Flight Assignment:IsI2/04/2021I2/04/2021Flight Assignment:Liquid Crystal FacilityI2/04/2021I2/04/2021Col Name (Institution):Glaser, Mathew Ph.D. (University of Colorado, Boulder) Shuai, Min Ph.D. (University of Colorado, Boulder) Shuai, Min Ph.D. (University of Colorado, Boulder)I2/04/2021Gant/Contract No.:NNX1AC74GNNX1AC74GI2/04/2021 | PI Web Page: | | | |
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| Rationale for HRP Directed Research: Research Impact/Earth Benefits: | Task Description: | Paramagnetic ferrofluids are familiar as suspensions of magnetic particles in solvents that become strongly magnetized in applied fields. A longstanding challenge has been to make such fluids ferromagnetic, so that they exhibit spontaneous macroscopic ferromagnetic ordering even in the absence of applied field. Recently, ferromagnetic fluid phases have been achieved by the ferromagnetic orientation of magnetic nanoplates in colloidal suspensions, either by dispersion in a thermotropic nematic liquid crystal host or by spontaneous nematic ordering in an isotropic solvent. These novel materials are optically birefringent, dichroic, and translucent, so that structures and textures can easily be visualized in polarized light. They manifest a variety of interesting and distinctive magnetic fields. Field-induced changes in the static magnetization, display ultrahigh sensitivity to externally applied magnetic fields. Field-induced changes in the stape of fluid drops, such as interfacial magnetic spike instabilities, occur even in the Earth's magnetic field and readily achievable benchtop magnetic fields are expected to induce spectacular magnetofluidi cresponses. Ferromagnetic nematics also exhibit distinctive magnetic self-interactions, including liquid crystal textures of fluid magnetic domains arranged in closed flux loops, that in microgravity should strongly affect the shape of free-floating drops. Freely suspended smeetic LC films in the form of bubbles, the LC geometry currently studied in OASIS (Observation and Analysis of Smeetic Islands in Space), will be rendered ferromagnetic by doping with magnetic manoplates and manipulated magnetically. In suspensions studied on Earth, the typically more dense liquid crystal phase sediments to the lower parts of test cells, leaving a sharp interface with the co-existing isotropic phase. Microgravity offers the opportunity to perform critical experiments that are not possible on Earth, such as the observation of ferromagnetic in the absence of gravity, and magnetic islan |
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| Research Impact/Earth Benefits: | | |
| Now an isst for EV2017 | Research Impact/Earth Benefits: | Name and for EV2017 |
| Task Progress: New project for FY2017. | Task Progress: | New project for F 1 2017. |
| Bibliography Type: Description: (Last Updated: 12/04/2024) | Bibliography Type: | Description: (Last Updated: 12/04/2024) |