

Introduction and Background for Probe-class Mission CFP

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Introduction

- Probe-class missions came up as part of the Flagship-class mission discussions in 2015
- Both the PhysPAG and ExoPAG groups have already been developing Probe concepts as part of their strategic visions
- COPAG has been so focused on the development of JWST and WFIRST that Probe considerations have enjoyed little attention
- Despite numerous Probe studies in the 2000s – Origins Probes and ASMCS Studies – the Cosmic Origins community has few well developed ideas in place to advance to the Decadal Survey

The Definition

- For the purposes of issuing a Call for White Papers, we list the following definitions for Probe-class missions:
 - The cost envelope is intended to fill the large hole between MIDEX (currently \$250M) and Flagship (several \$B)
 - The scale of mission is modeled on the Discovery and New Frontiers classes of mission the Planetary Sciences Division has been using for decades
 - While previous Probe discussions have set a rigid cap at \$1B, the COPAG is interested to see what kind of return can be realised with a fuzzier definition of a cost cap – this is NOT intended to open the doors to \$2-3B missions
 - Such a cost cap likely translates to a meter-class mission
 - Probe-class missions are intended to be PI-led with a focused scientific investigation and NOT to be a general-user type observatory

The Call

- The COPAG issued a CFP in December 2015 for 2-page white papers on likely mission concepts from the Cosmic Origins community
- We do seek approximate cost estimates and the rationales upon which they are based
- Papers are due February 15, 2016
- Following the model we used in 2015 for Flagship-class mission input, we intend to use the papers to define the range of mission concepts such a mission line could enable
- This potential will be traded against the impact of such a mission line on subsequent Explorer call frequency and/or Flagship development timelines

Specific Aspects

- The Call seeks to clarify the following aspects of the mission concepts:
 - Science drivers – specific goals and questions to answer, and why this science cannot be done with existing facilities such as HST
 - Technical capabilities – specific capabilities and the flowdown that defines them – what combination of technologies need to be used to make the mission possible
 - New technologies – are any aspects of the mission concept dependent on new or emerging technologies and if so, what TRL are those technologies currently estimated to be at
 - Does the science program really need a Probe-class mission to make it happen – can it be done with a MIDEX or does it really need something even larger such as a Flagship?