

January 31, 2017

**Hubble Space Telescope**  
**Fundament Physics Working Group**

**Charter**

Since its inception, HST has played a key role in probing key parameters relevant to fundamental physics and cosmology. The  $H_0$  key project was a prime focus of Hubble's early years, and subsequent programs have reduced the uncertainty in  $H_0$  from ~50% to less than 3%. The improvement is a direct consequence of the substantial increase in accuracy enabled by HST's precisely calibrated observations. A variety of other projects, such as dark matter tests with the Bullet cluster, have been carried out with HST data.

The Space Telescope Science Institute's Director, Ken Sembach, has decided to constitute a working group to explore the intersection between Hubble's capabilities and the scientific priorities in fundamental physics research and to provide advice on future strategies for implementing appropriate observing programs with HST. These programs may provide new information on their own, or be precursor observations needed to answer fundamental physics and cosmology questions with other telescopes, perhaps even those not yet expected to be operational until the next decades or beyond. Working Group members will be drawn from the physics and observational cosmology communities.

The Fundamental Physics Working Group is hereby charged with the following primary tasks:

- Explore how HST observations in the coming years can be applied directly to refining measurements of key parameters;
- Determine how HST observations can complement and supplement observations by other facilities;
- Identify key legacy observations that HST should obtain to lay the foundation for future experiments in fundamental physics;
- Consider and recommend implementation strategies that could be applied to enabling more effective use of HST in all of these areas.

The Working Group will summarize its conclusions in a report to the Director and an associated presentation to the STUC in 2017.