

# **CRITICAL MASS PROGRAM**

**Scene One:** Vibration/Heavy Mass - Earth Harp

**Scene Two:** Gathering MASS - “Oh Yeah”

**Scene Three:** Light /The Speed of Light/PASSING  
STORM/Magnetic Storm

**Scene Four:** Sonic Boom – The Speed of Sound

**Scene Five:** Golden Sun

**Scene Six:** I Could See

**Scene Seven:** Indian Universe

**Scene Eight:** Summertime

## **Intermission**



**Scene One:** Finding the Edge - Wing Beat

**Scene Two:** Earth Harp Voices

**Scene Three:** Mass Transfer – The Aqua tar

**Scene Four:** Spinning/Gravity

**Scene Five:** Collapse – Right down to you

**Scene Six:** Explosion Aria – Critical MASS

**Scene Seven:** Fusion/The Sun Jig

"Critical MASS is an abstract musical. A poetic art form inspired by theories and philosophies that relate to our known physical universe. The work is not a literal interpretation, but rather an artistic response. The concepts explored with in the show are as rich in metaphor as they are in theory. The show is for both the mind and the heart. From the smallest elements of life to the largest expanses of the universe, all things are affected by the world of physics. Through open minded and inventive scientists we gain a truer understanding of how our universe works and our place in it. The Critical MASS performance is born out of this same open-minded inventiveness. New instruments, music and technologies bring the musical art form to a new place, a new understanding. It has been a natural and enjoyable progression for us to use science as a source of inspiration in the creation of this new show.

We hope you enjoy Critical MASS..."  
- **Bill Close, Artistic Director** -

## THE RELATIVISTIC UNIVERSE


In Einstein's universe, mass is converted into energy in the cores of stars, enabling them to shine, while matter curves space, and time flows faster or slower depending on relative motion or gravity. Einstein's General Theory of Relativity has largely stood the test of time; its manifestations are much evident in the observable universe. Indeed, current models of how the cosmos began and evolved are largely founded upon Einstein's theory.

Present models acknowledge that in "the big picture," gravity reigns supreme and alone will decide whether the universe keeps expanding or falls back on itself in a "Big Crunch." So it's understandable that some physicists remain unsettled that a key prediction of Einstein's General Theory, namely gravitational radiation, remains unverified nearly 80 years later. Then there are black holes. It wasn't until after Einstein's death that black holes were conceived, though the space-time singularities they contain were anticipated early on by some physicists, beginning with Karl Schwarzschild. Most relativity researchers now believe that General Relativity is not only

consistent with black holes but demands that they exist under certain conditions. Prove that black holes populate the cosmos, and you've pretty much confirmed an important component of General Relativity. Also, if black holes are for real, under certain conditions they could prove to be powerful sources of gravitational waves, which are also postulated by General Relativity. However, other cosmic phenomena could generate these ripples in space-time.

When all is said and done, the jury is still out on both counts for lack of conclusive evidence. Nevertheless, over the past decade, impressive advances in both instrumentation and computation are at last making it possible to put General Relativity through its ultimate trial. Many scientists are confident that it will emerge not merely unscathed but triumphant. But first, though, tomorrow's gravitational wave astronomers need to catch their quarry. For this they need a list of prime suspects whose "finger prints" can be matched to the gravitational waveforms predicted by theory.

According to General Relativity, the key qualities of strong sources of gravitational waves are that they be non-spherical, dynamic (i.e. change their behavior with time), and possess large amounts of mass moving at high velocities.

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