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Annette Horsley	good afternoon from NC
Jenny McFarlane	Hello from Reno, Nevada!
Abbas Mokhtar-zadeh	Greetings from Waxhaw, NC
Kelly Lepo	Speaker slides and resources are avaible at https://universe-of-learning.org/contents/events/science-briefings/2023/science-briefing-extreme-speeds-in-the-universe
Dennis Roscoe SSA	Hello From Wisconsin
Anthony Bryan	I believe the statement "all galaxies are moving apart" does not apply in galaxy groups. The Milky Way and Andromeda Galaxies are moving toward each other and should meet in some billions of years in the future. Right?
Brittany Brockenton	Do inflation theories address the makeup of a constant medium that would hold multiple universes? Like maybe dark matter or a type of void or something something like that?
Francisco Silva-SSA	My question is, how are we sure that the universe is expanding? I want to give an example. We are on a beach looking towards the Pacific. There are 100 ships, each of different sizes, and we see them moving away in all directions. It is the Pacific Sea getting bigger or just the boats moving? this is what I can not get
Francisco Silva-SSA	My next question is if light is made of particles that have no mass, how is it affected by the gravity of a black hole?
John Martinez	What is accelerating the jets to such high velocities?
Francisco Silva-SSA	Question for Eileen, is there any evidence that dark energy or dark matter interacts with black holes? and what are your thoughts on white hole?

Loretta McKibben	So extreme speeds in the early universe are due only to inflation of the universe? And all are less than c, the speed of light? What role did mass play then, from the hot plasma that became mostly hydrogen in the early history?
Francisco Silva-SSA	Ask to Kareem, which star surprised you the most and why?
Lindsay King	You're correct about galaxy groups etc and Milky Way due to collide with Andromeda! Slipher and Hubble spotted nearby objects actually with blueshifts rather than redshifts. Locally, gravity between galaxies can "overcome" the Hubble expansion. There will be systems where the galaxies are also moving towards each other but as a whole they are moving away from us.
Lindsay King	Ignoring the close by galaxies, dominated by gravity between them, the further away the galaxy, the faster it is receding from us (due to the expansion of space). This receding causes a shift in the spectral lines from galaxies, with the shift bigger for more distant galaxies. The redshift is also related to the size of the Universe when the light was emitted - so if we say z=1, that means the Universe was 1/2 the size of today when that light started traveling to us.
Donald Miller	Question for Jeff: is there any way to distinguish hyper velocity white dwarfs in our galaxy that came from another galaxy?

Eileen Meyer	Dark Energy/Dark Matter: No evidence that these play a role. One thing we know about Dark matter is that whatever it is, it's *not* very interactive. It mostly streams through normal matter without interacting with it at all. The only real connection I can think of is that it's possible the distribution of dark matter in the early Universe influenced ("seeded") the formation of galaxies and their central super-massive black holes. For Dark Energy, similarly, there is no real influence beyond it's effect on the overall expansion of the Universe, which is largely unimportant in the short time-frame dynamics of jets.
Loretta McKibben	So Sirius could eject its white dwarf companion when it goes supernova?
Derek Wallentinsen	Kareem: How many of these WDs ae now shooting around in the Milky Way?
SSA Anya Hartpence	What portion of the electromagnetic spectrum is used to image plasma jets? It was mentioned radiowaves were used to fill in where visual wasn't available if I understood that correctly?
Eileen Meyer	White holes: probably don't exist! While GR "allows" them, in a mathematical sense, the laws of thermodynamics makes it basically impossible for a present-day process to create them. They could, maybe, be created at the dawn of the Universe, but they would be incredibly unstable and would have evaporated by now.
Bridget Kimsey	in the white dwarfs and other stars, transferring material/elements from one galaxy to another...does this material impact the galaxy?

Eileen Meyer	For Anya: Plasma Jets emit radiation over a huge range of wavelengths! Very prominently in the radio, but extending up in energy to optical and even X-rays.
Anthony Bryan	Kareem -what was your sample size compared to the total population of stars in our galaxy? What number of these extremely fast moving stars can be expected/suggested in our galaxy?
Anthony Bryan	you just answered it!
Bridget Kimsey	Thanks!
Dennis Roscoe SSA	Great presentations Thank You.
Jim Kovac	Thanks for great presentations!
Susan Raizer	thanks to all presentters. Very informative.
Kelly Lepo	Speaker slides and resources are avaible at https://universe-of-learning.org/contents/events/science-briefings/2023/science-briefing-extreme-speeds-in-the-universe
Eileen Meyer	Thanks to the audience! :)
Dennis Crowley	Great job!
Loretta McKibben	Love the resources! And that multi-wavelength slider that is linked to, of jets.
Carol Abbott	Really interesting ideas. Thank you all.
Sally Jensen	cool stuff. a lot to think about. thank you.
Lindsay King	Thanks everyone for being here!
Francisco Silva-SSA	thanks 👍
Loretta McKibben	Wnderful science briefing. Thank you all so much!
Andy Flynt	Thanks for a great presentation!
Donald Miller	Awesome set of presentations. Thank you!
Zach Amis-SSA	Thank you, fascinating stuff
Abbas Mokhtar-zadeh	Thank you!
Anthony Bryan	Thanks!
Jenny McFarlane	Thanks!
Saher	Thank you, everyone!
Randee Gurban	Thank you very interesting. Great resources.

Edward Mahoney	Mahalo from Maui
Lisa Gethard NASA/JPL Solar System Ambassador	Thank you so much everyone!
Loretta McKibben	Thanks again!
Lisa Gethard NASA/JPL Solar System Ambassador	Great stuff!