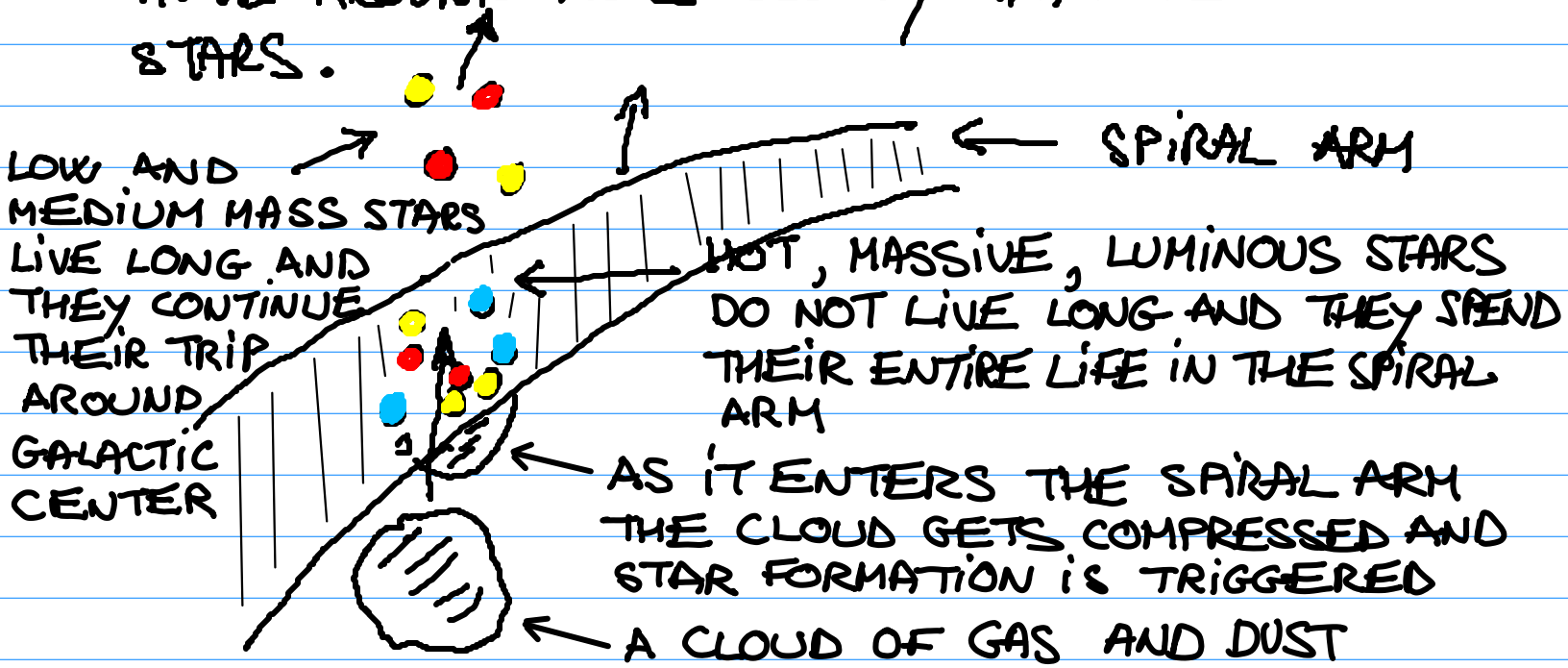
SPIRAL ARMS OF THE MILKY WAY:

THEY ARE THE WAVES OF COMPRESSION OF THE MATERIAL IN THE DISK AND THEY MOVE AROUND MORE SLOWLY THAN THE INDIVIDUAL STARS.

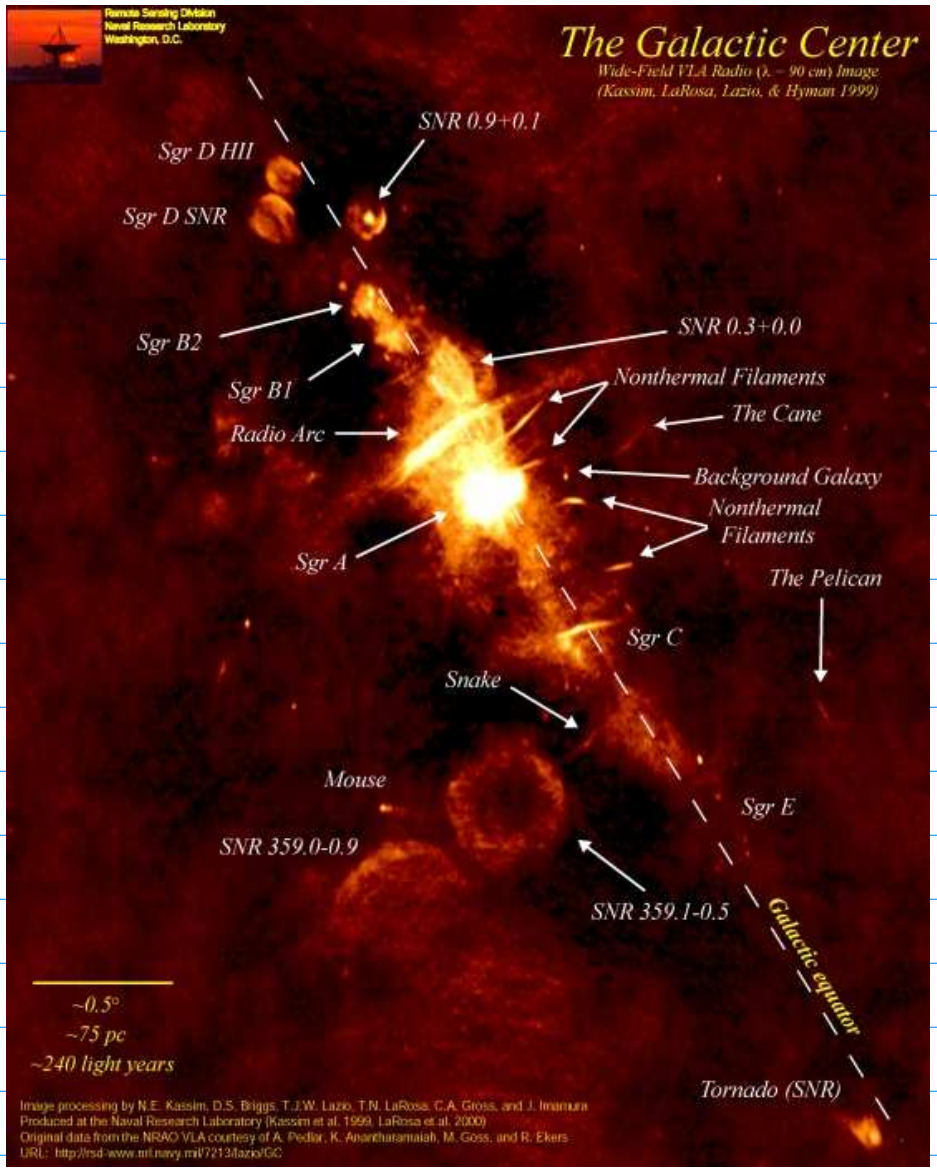


NOTE: THE AVERAGE STAR STAR DISTANCE IS A FEW LIGHT YEARS WHICH IS 10 MILLION TIMES LARGER THAN THE STAR DIAMETER. THEREFORE, THE PROBABILITY OF TWO STARS COLLIDING IS EXTREMELY SMALL ($\simeq 0$).

THE CENTER OF THE MILKY WAY IS IN DIRECTION OF CONSTELLATION SAGITTARIUS AND IT IS NOT OBSERVABLE AT VISIBLE WAVELENGTHS BECAUSE THE GAS AND DUST IN THE DISK BLOCKS THOSE WAVELENGTHS.

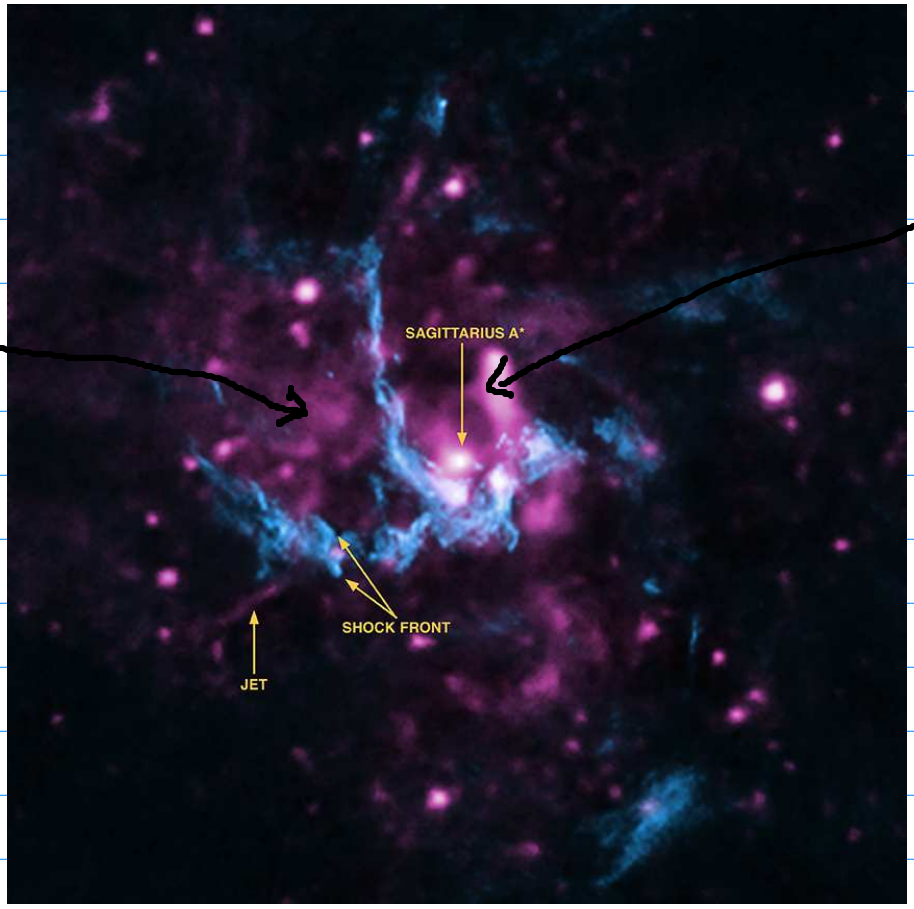
THE GALACTIC CENTER IS OBSERVABLE AT THE RADIO WAVELENGTHS, AND AT THE X-RAY WAVELENGTHS, BECAUSE SUCH RADIATION CAN PASS THROUGH GAS AND DUST.

RADIO IMAGE OF THE GALACTIC CENTER:



AT THE VERY CENTER IS SAGITTARIUS A (SgrA) AND AT ITS CORE IS A VERY INTENSE SOURCE OF RADIO WAVES KNOWN AS SgrA*.

THE IMAGE OF SgrA* AT RADIO AND X-RAY WAVELENGTHS:



X-RAYS

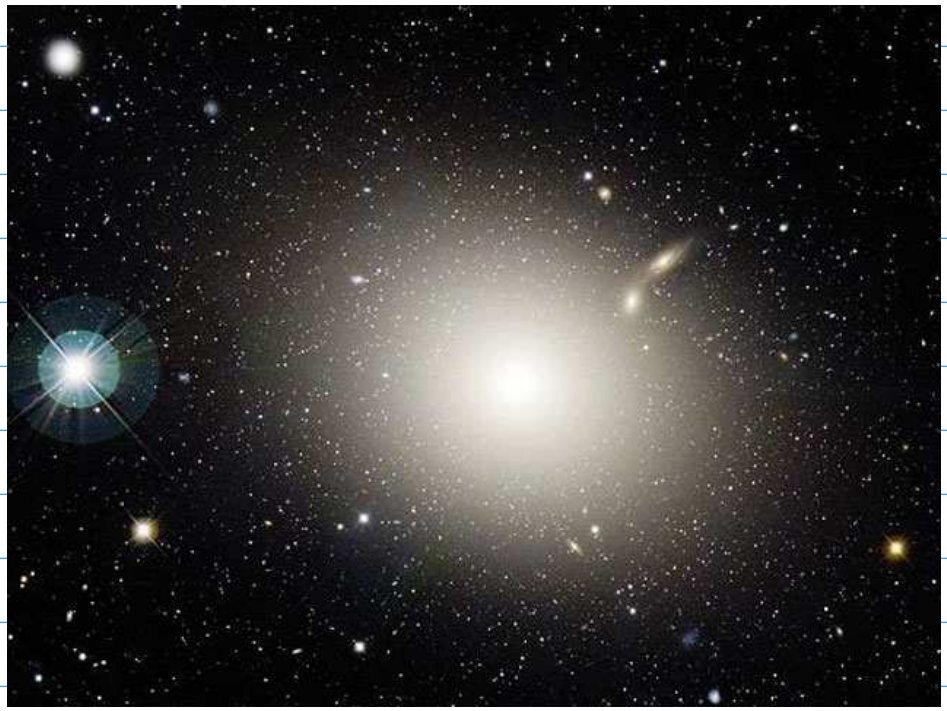
RADIO WAVES

USING THE THIRD KEPLER'S LAW AS FORMULATED BY NEWTON ASTRONOMERS HAVE DETERMINED THE MASS OF THE CENTRAL OBJECT FROM ORBITAL DATA OF THE STARS REVOLVING CLOSELY AROUND GALACTIC CENTER. THE MASS OF THE CENTRAL OBJECT IS 4 MILLION SOLAR MASS. SOMETHING THAT MASSIVE CAN ONLY BE A BLACK HOLE. IT IS FOUND THAT OTHER GALAXIES ALSO HAVE SUPERMASSIVE BLACK HOLES AT THEIR CENTERS.

GALAXIES (CH. 17)

CLASSIFICATION OF GALAXIES BASED ON THEIR APPEARANCE AT VISUAL WAVELENGTHS:

1) ELLIPTICAL GALAXIES (E)



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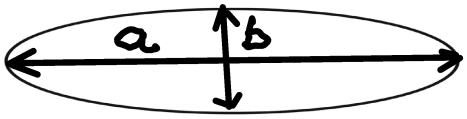
THEY CONTAIN NO VISIBLE GAS AND DUST AND LACK HOT BRIGHT STARS. THEY CONTAIN MOSTLY POPULATION II STARS AND TEND TO BE RED.



DEVIATION FROM THE PERFECT SPHERE IS CHARACTERIZED BY THE NUMBER

$$10\,\frac{a-b}{a}$$

E0, E1, E2, ..., E7

E0 ↑ $a=b$ SPHERICAL SHAPE

E7 ↑ HIGHLY ELLIPTICAL