

Ferramentas para a astronomia extragaláctica

Projeto realizado por:

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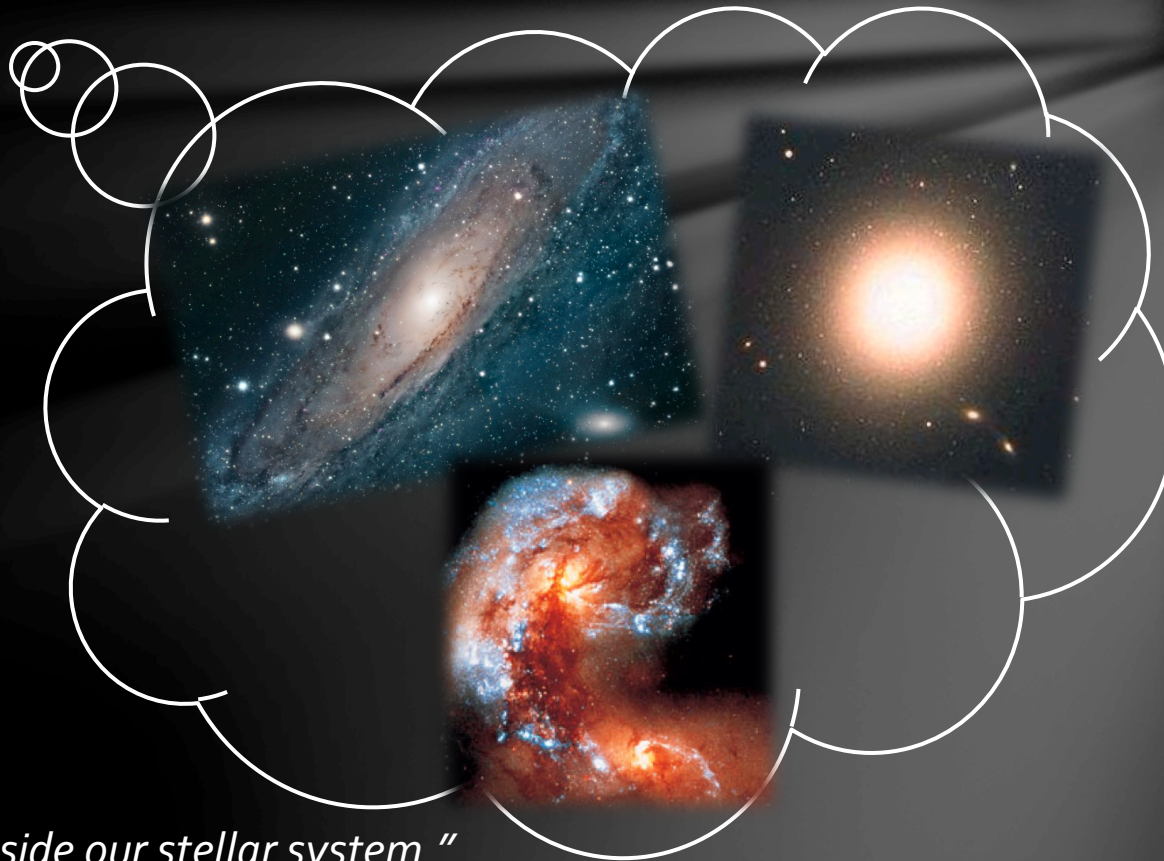
Mónica Sousa

Roberto Pires

Com a ajuda e
supervisão do
excelente
monitor:

História das galáxias

- Tempos anteriores a Edwin Hubble...
- 1929 - Edwin Hubble e a grande descoberta!



"The great spirals...apparently lie outside our stellar system."

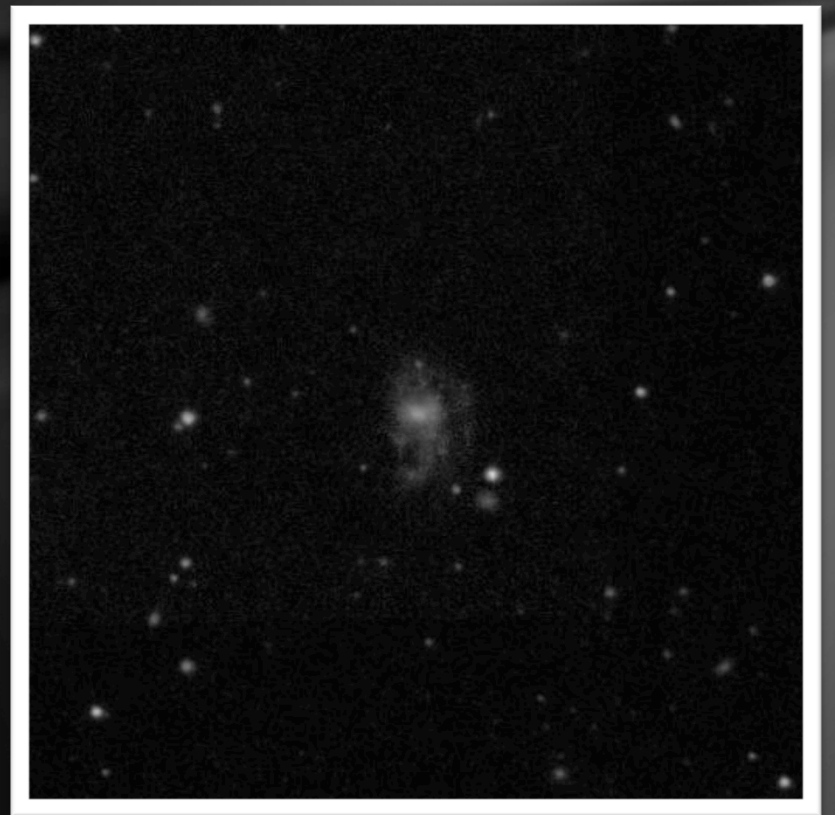
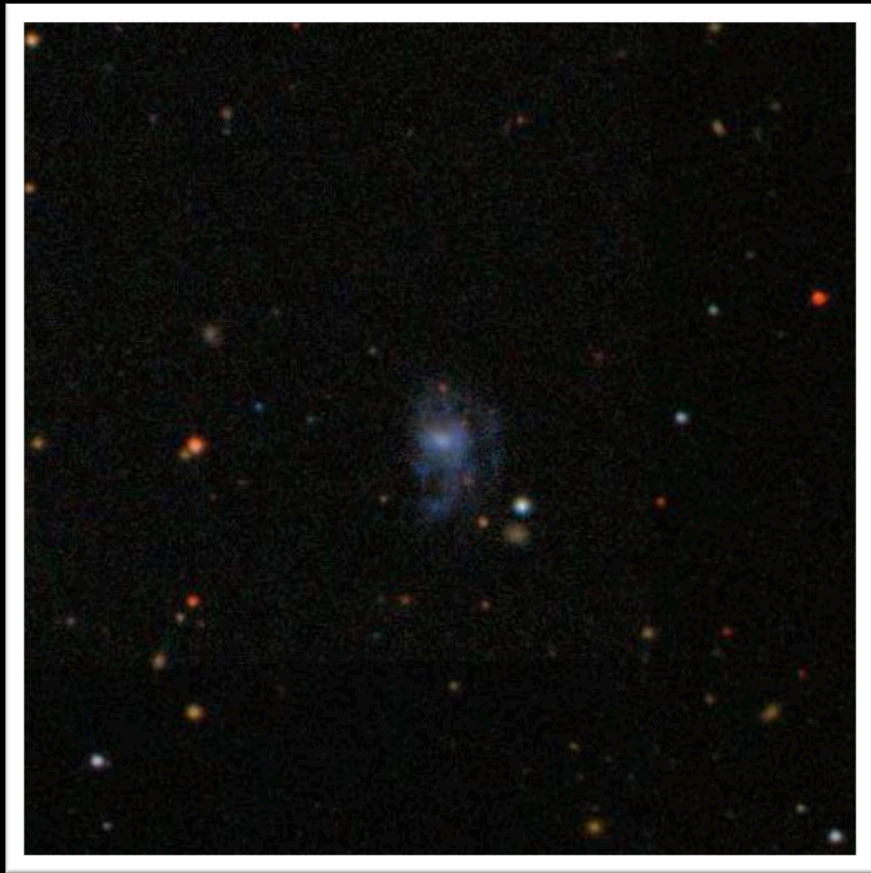
Tipos de estrelas

Classe	Temperatura	Cor convencional	Cor aparente ^{[1][2]}	Massa (massas solares)	Raio (raio solar)	Luminosidade	Linhas de hidrogénio	% das estrelas da sequência principal ^[3]
O	30,000–60,000 K	azul	azul	64 M _☉	16 R _☉	1,400,000 L _☉	Fraco	~0.00003%
B	10,000–30,000 K	azul a azul-branco	azul-branco	18 M _☉	7 R _☉	20,000 L _☉	Médio	0.13%
A	7,500–10,000 K	branco	branco	3.1 M _☉	2.1 R _☉	40 L _☉	Forte	0.6%
F	6,000–7,500 K	amarelo-branco	branco	1.7 M _☉	1.4 R _☉	6 L _☉	Médio	3%
G	5,000–6,000 K	amarelo	amarelo-branco	1.1 M _☉	1.1 R _☉	1.2 L _☉	Fraco	7.6%
K	3,500–5,000 K	laranja	amarelo-laranja	0.8 M _☉	0.9 R _☉	0.4 L _☉	Muito fraco	12.1%
M	2,000–3,500 K	vermelho	laranja-vermelho	0.4 M _☉	0.5 R _☉	0.04 L _☉	Muito fraco	76.45%

Grande Nuvem
de Magalhães

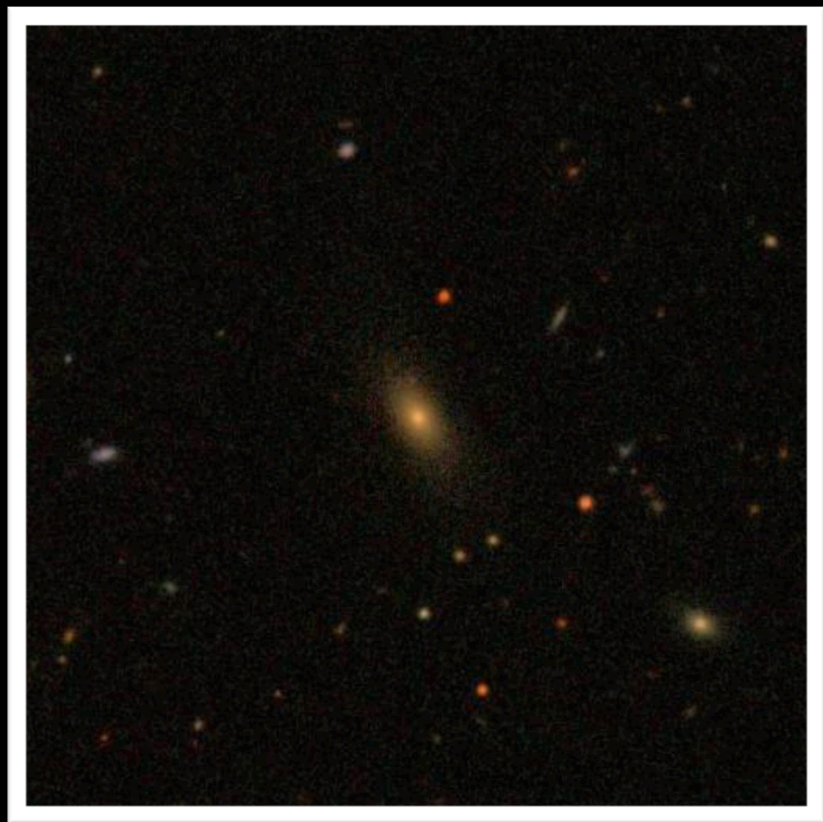
Galáxias irregulares

NGC 4449



Galáxias elípticas

The background of the slide is a deep space scene filled with numerous stars of various colors, including white, yellow, and blue. Several elliptical galaxies are scattered throughout the field. Some are bright and appear as smooth, glowing ellipses, while others are fainter and more distant. The galaxies vary in color, with some appearing white or yellow and others having a reddish or orange hue. The overall composition is a rich field of celestial objects, with the text 'Galáxias elípticas' centered in the middle.





Galáxias espirais



Quadro de resumo:

Galáxias	Cor	Tamanho (M_s)	Tipo de Estrelas	Espectro
Irregulares	azulada	$\leq 10^7$	O, B	Riscas de Emissão
Elípticas	avermelhada	$10^9 - 10^{11}$	K, M	Riscas de Absorção
Espirais (Centro)	avermelhada	$10^7 - 10^9$	K, M	Riscas de Absorção
Espirais (Braços)	azulada	$10^7 - 10^9$	O, B	Riscas de Emissão

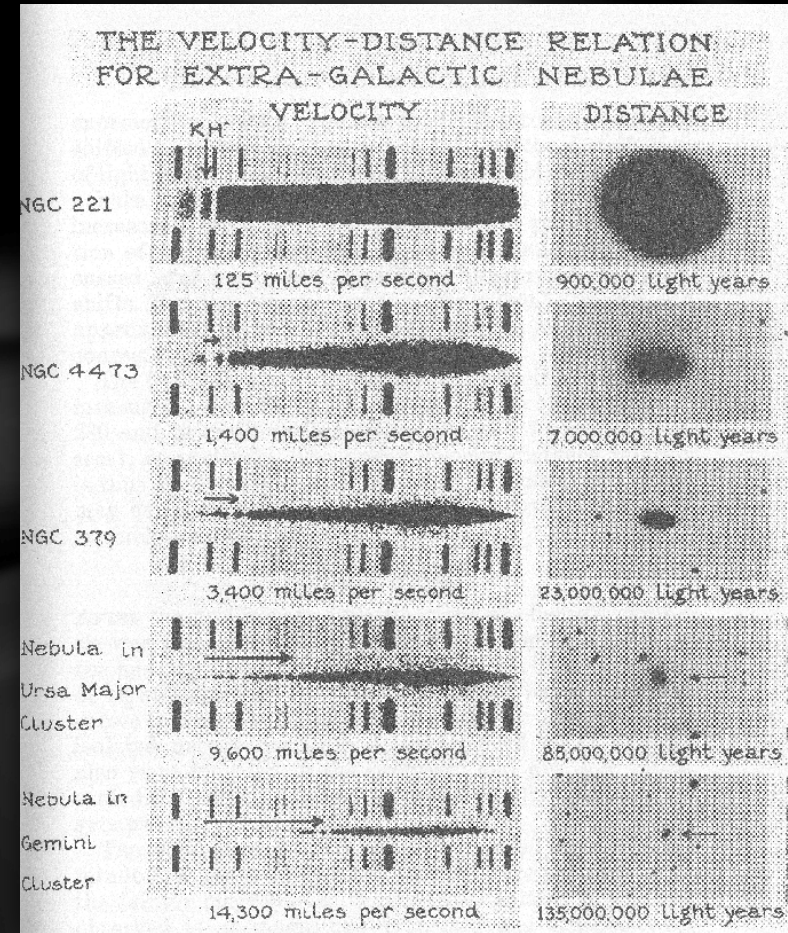
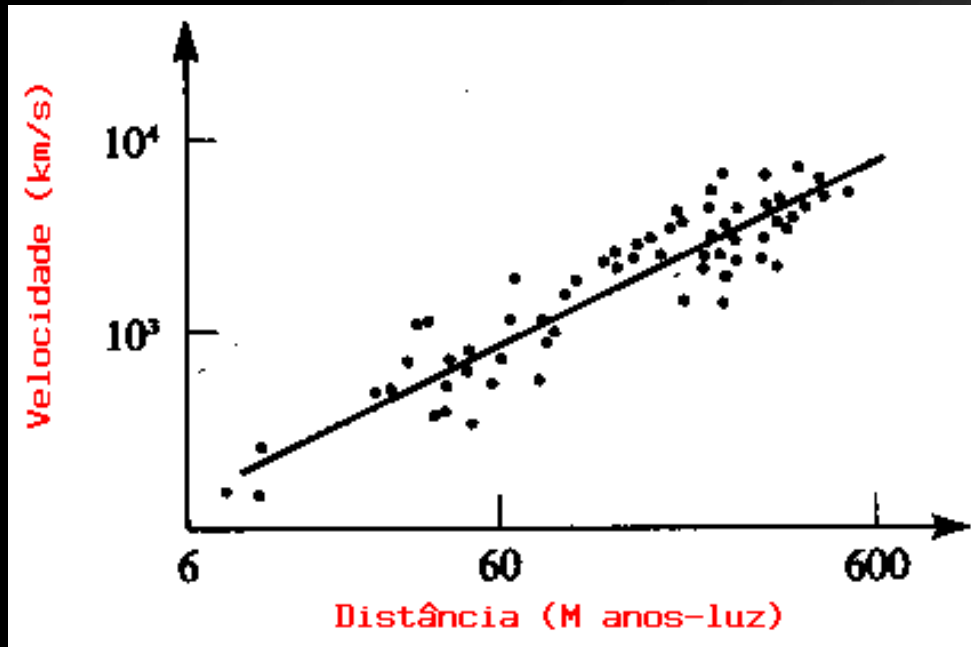
Lei de Hubble

1pc = 3,26 anos-luz

H_0 - Constante de Hubble ≈ 70 km/s/Mpc

V_r - Velocidade de recessão (km/s)

d - Distância da galáxia (Mpc)



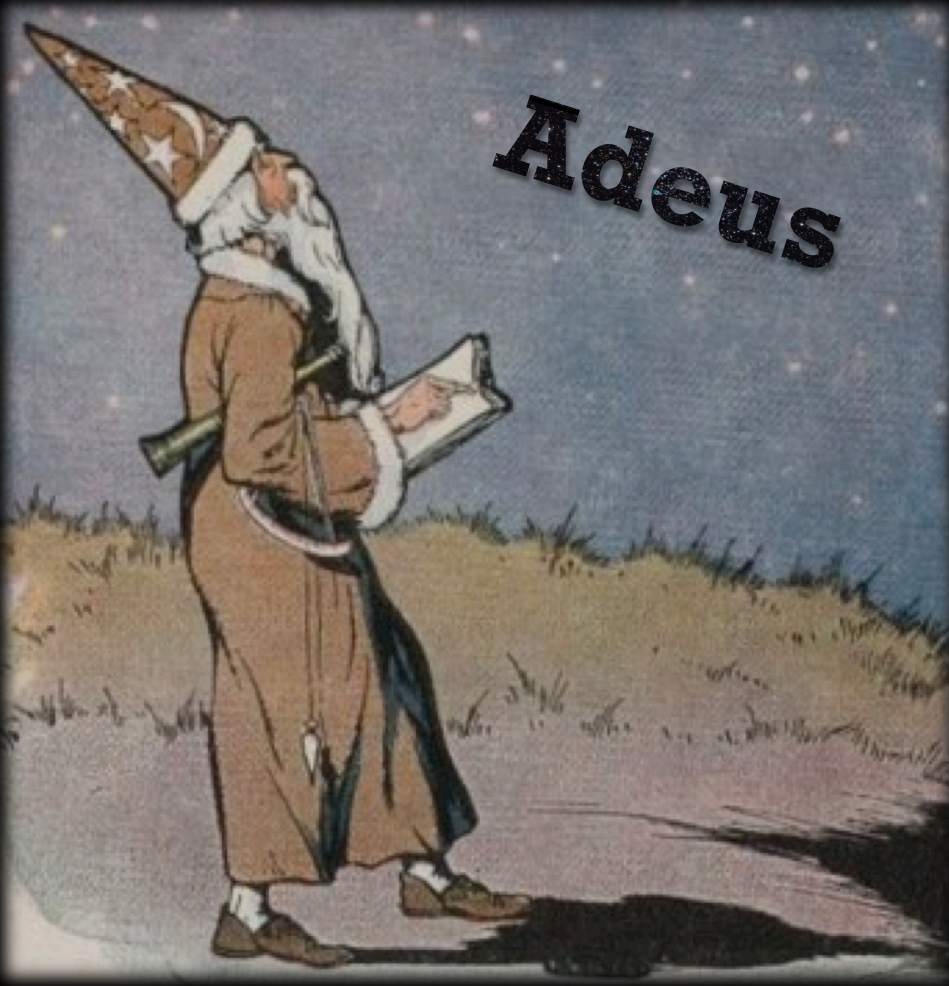
$$z \text{ (redshift)} = d\lambda/\lambda_0 \ll 1$$

$$V_r = H_0 \times d$$

Vídeo:



Têm dúvidas?!



Obrigad