X-ray observations such as this one from the Einstein satellite are beginning to reveal some of the structure of the very centre of the Galaxy.

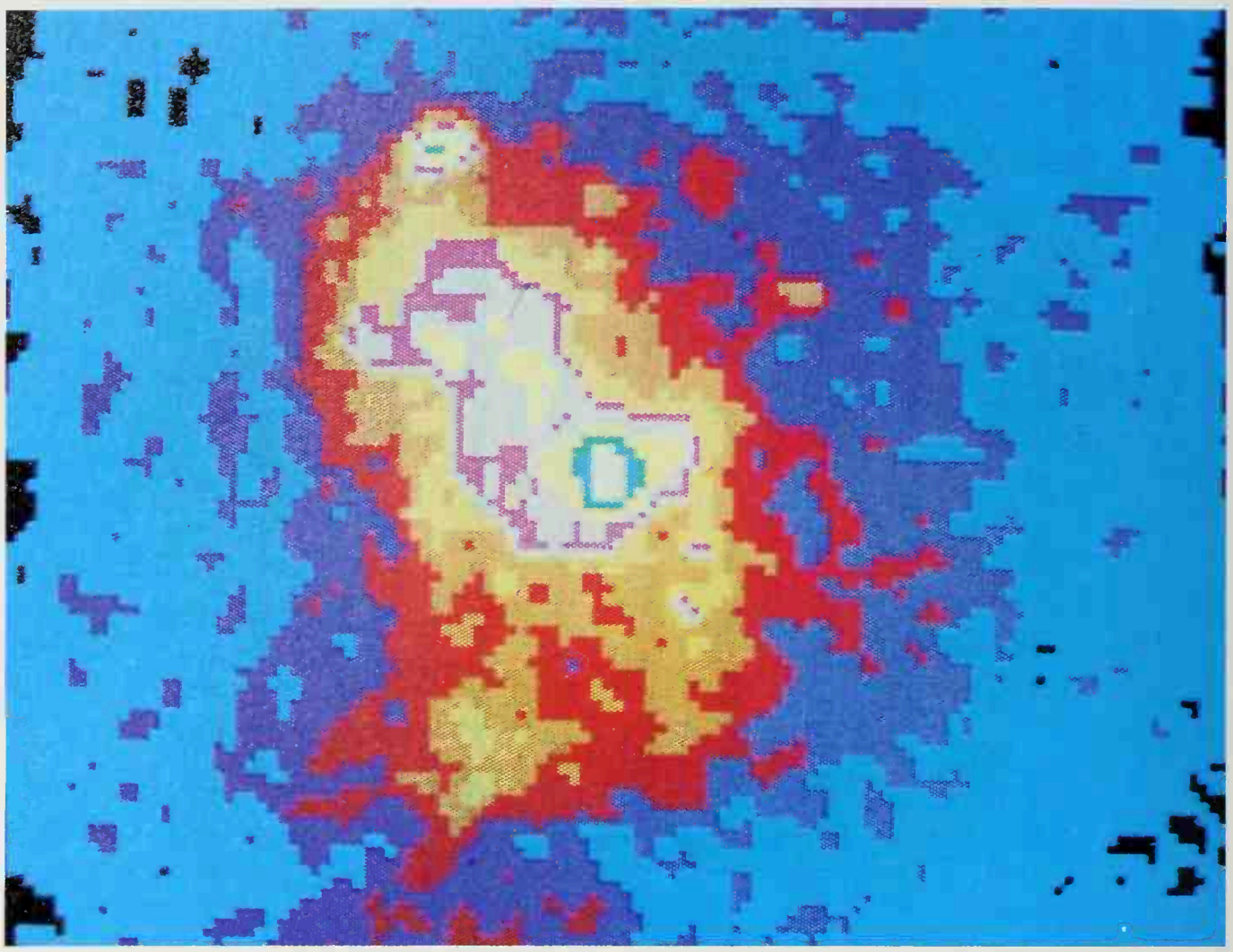
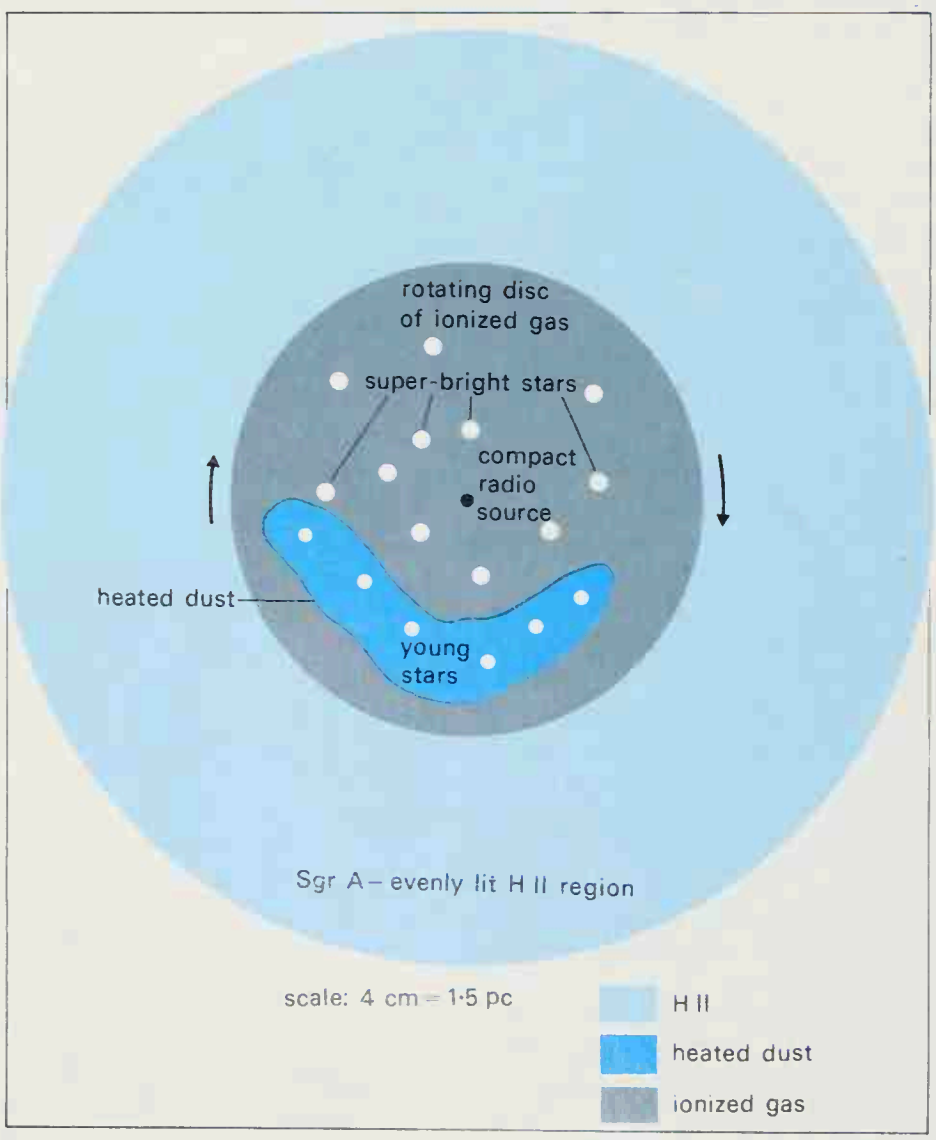


Fig. 6·9 below: *Surrounding the compact radio source which marks the exact centre of our Galaxy is a rapidly-rotating disc of ionized hydrogen, part of the radio source Sagittarius A.*



au across, with 25 per cent of the power coming from an ultracompact source only 10 au in diameter. Although the output from this source is some tens of millions of times weaker than the fantastically powerful nuclei of exploding galaxies, its emission, volume for volume, is comparable. And it is staggering to consider that our galactic centre radio source would comfortably fit inside Jupiter's orbit, were it in the Solar System.

Present-day physics knows of only one mechanism which can produce such concentrated energy: the acceleration of charged particles in an accretion disc around a black hole. Current ideas of galaxy evolution indicate that a central massive black hole may form early on in a galaxy's life, following on from the first rapid infall of matter. The black hole need not always be 'active', with an energetic accretion disc, but when there is sufficient gas present, the nucleus will be able to glow, and there will be a source of energy capable of pushing away clouds of gas at high speeds.

At present, our Galaxy is certainly not active. But there are other galaxies – Seyfert and radio galaxies, for example – which show evidence for intermittent explosions.

If this picture is correct, when did our Galaxy's nucleus last flare up? To account for the 3 kpc arm, there must have been an explosion some 12×10^6 years ago; while the expanding molecular ring points to an outburst 10^6 years in the past. In addition, there may be less violent activity on a timescale of about 10^4 years, maintaining the turbulent gas motions in the small ionized disc.