

Late Risers Are Cheated On More Frequently

Daily rhythm influences fatherhood in great tits



Sleeping in is more enjoyable, but it also lowers reproductive success – at least if you are a great tit. Researchers at the Max Planck Institute for Ornithology in Seewiesen and Radolfzell discovered that male great tits that rise later than their conspecifics are cheated on more frequently by their female mates. The researchers used mini-transmitters to monitor when the animals wake up in the morning. Also, under the skin of some of the males, they placed a small implant

containing melatonin, a hormone that plays a major role in regulating the internal clock. As a result, birds that received a melatonin implant woke up later. Thus, instead of waking up early and defending their female against competitors, the males with the implant were still sleeping soundly while their mates amused themselves with other males. Many of the chicks in the nests were therefore the offspring of other males.

(FUNCTIONAL ECOLOGY, June 3, 2015)

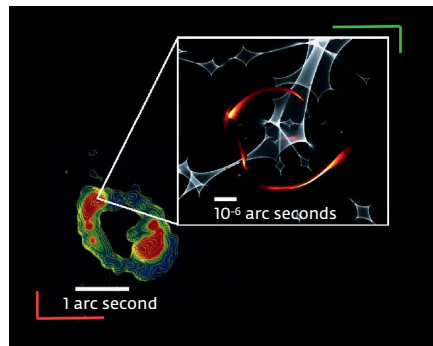
A transmitter on the back of the great tit tells the researchers when the animal wakes up in the morning.

A Black Hole under the Gravitational Lens

Turbulent processes take place close to supermassive black holes, which lurk in the centers of nearly all galaxies. These massive monsters swallow up matter flowing in from the outside while at the same time producing gas jets that shoot out into space in two opposite directions. Researchers at the Max Planck Institute for Physics in Munich and the University of Geneva have now succeeded in localizing the origin of the high-energy gamma radiation in such a jet. To achieve this, the researchers observed an active galaxy known as PKS 1830-211, in which one of the two jets happens to be directed toward Earth. In addition, roughly half way between this blazar and Earth, there is a galaxy that acts as a gravitational lens, amplifying the light. The scientists conclude from

the effects they observed that the registered gamma radiation originates from a compact region measuring just a few billion kilometers, and is generated very close to the black hole, or essentially at the foot of the jet.

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Looking at a distant galaxy: The radio chart (bottom left) shows the image of the blazar PKS 1830-211 distorted by the gravitational lens effect. The detail on the right is a simulation of the micro-gravitational lens effect in the gamma ray region; direct observation of the orange ring – it also represents images of the blazar – isn't possible due to its small size.

Alzheimer's Spares Long-Term Musical Memory

Alzheimer's erases a large part of patients' memory. The disease seems to spare only musical memory, as Alzheimer's patients can often recall musical pieces even when other memories have already faded. In some cases, they are able to sing lyrics of songs even when speaking has become almost impossible for them. Scientists at the Max Planck Institute for Human Cognitive and Brain Sciences in Leipzig wanted to know why musical memory is less affected by Alzheimer's. To this end, they first had to locate the seat of musical memory in the brain. The researchers played top-10 hits, children's songs, oldies and well known classical pieces to Alzheimer's patients while using magnetic resonance imaging to measure their brain activity. In this way, they identified the so-called supplementary motor cerebral cortex as the seat of long-term musical memory. Analyses of the brains of Alzheimer's patients show that this region is less affected by the disease: it loses fewer neurons than the other brain regions, and its metabolism doesn't decline as much.

(BRAIN, June 3, 2015)