

Some astrophysicists argue for a hot, fat disk; some for a cool, thin disk; others for a combination, a cool, thin disk surrounded by a hot corona. Now, according to Mitchell C. Begelman of the Joint Institute for Laboratory Astrophysics in Boulder, Colo., all three may be right under different circumstances. According to Begelman's theoretical analysis, each of these disk configurations can develop out of different initial conditions, and it may be the disk configuration that determines what kind of active galactic nucleus we see in a given instance.

Not all the matter that goes through the accretion disk crosses the event horizon. A lot of it gets deflected and shot away. Electromagnetic radiation is produced

by and comes along with this outflowing matter. The spectrum observers see is a complicated combination of visible light, ultraviolet, X-ray and radio. Observers generally agree that this is a secondary spectrum much processed and reprocessed on the way out.

Forces stressing matter nearest the event horizon seem to produce high-energy gamma rays, according to Jean A. Eilek of New Mexico Tech in Socorro and A. C. Fabian of the Institute of Astronomy in Cambridge, England. These gamma rays, interacting with other matter, produce pairs of electrons and positrons. Thus the "atmosphere" — the matter immediately surrounding the black hole — consists of electrons and positrons mixed

with gamma rays. Accelerated by shocks or by electric and magnetic fields, this atmosphere produces the observed spectrum.

However, the situation in the atmosphere is complex. As Fabian points out, electrons and positrons can annihilate each other, producing new gamma rays. There is thus a complicated interplay of linked cycles of production and destruction of electrons, positrons and gamma rays. This makes it difficult to find unambiguous spectral evidence for this electron-positron atmosphere. The annihilation produces gamma rays of a specific energy, but because of the complexity of the situation, says Fabian, this "is going to be hard to see." — *D.E. Thomsen*

## Late-night legislation: New laws include revised Superfund

In an apparent eleventh-hour turnabout last week, President Reagan offered the departing 99th Congress a much-sought prize — his signature on the five-year, \$9 billion Superfund bill. Environmental Protection Agency (EPA) Administrator Lee M. Thomas describes the bill as "strong legislation." Sen. Frank R. Lautenberg (D-N.J.) goes even farther, calling it "the most significant piece of environmental legislation [in] this decade."

The President had threatened to veto the bill, not only because of its cost — more than five times that of the initial five-year toxic-waste cleanup program — but also to protest how the program would be financed (SN: 10/11/86, p.230).

The new law requires that EPA ensure that long-term cleanup commence over the next five years at a minimum of 375 new sites, almost four times as many as during the initial five years. Moreover, it gives EPA less discretion; both the standards and the cleanup schedules it enforces will be set by statute.

Under the new legislation, health assessments are required for the most hazardous dumps — those on the "national priority" list. (The current priority list of 703 sites is eventually expected to at least double.) EPA must also compile a toxicological profile for each of the 275 most commonly found waste-site chemicals affecting health. Another new provision extends the period during which individuals can file health-related claims against dumpers; the statute of limitations now starts not upon exposure but upon illness.

In addition, the law sets up a \$100 million research, demonstration and training program on new cleanup technologies; a \$98 million research program to detect and evaluate waste hazards and their health effects; and specific authority for EPA to study indoor-air problems and their mitigation, especially those posed by radon (SN:

9/27/86, p.201).

The President has also just signed:

- the Federal Technology Transfer Act of 1986, on Oct. 20. The law establishes a monetary incentive system to reward inventors in federal laboratories, permits the federal laboratories to enter into exclusive licensing agreements with private companies and funds the Federal Laboratory Consortium — a network of people in the federal laboratories who assist inventors in translating the fruits of their creativity into marketable products. The act's budget is anticipated to be about \$900,000 per year.

- the Computer Fraud and Abuse Act of 1986, on Oct. 16. This law makes it a federal offense to use a computer to damage or steal data from the federal government or from federally insured financial institutions, to damage or steal data through interstate computer manipulations or to traffic in computer passwords.

At press time, bills still awaiting the President's signature included:

- the Clean Water Act Reauthorization, passed unanimously, both in the House on Oct. 15 and in the Senate on Oct. 16. In addition to providing \$18 billion over nine years for sewage treatment facilities, the bill proposes two new programs. One would provide \$400,000 a year in grants so that state governments could set up programs to control chemical runoff from "non-point" pollution sources, such as farms, city streets and construction sites. A "toxic hotspots" provision would require that EPA and the states set stricter requirements for the discharge of emissions in areas where several heavy industrial polluters are sited nearby. This bill represents a "breakthrough" of sorts, according to Sharon Newsome of the National Wildlife Federation in Washington, D.C., which lobbied for its passage. Since the Clean Water Act expired in 1982, she says, the House and

Senate have not been able to agree on funding for the reauthorized program, so money has been appropriated at about the same level from year to year. The President has objected to this bill's high price tag. But even if he pocket-votes it (does not sign it within 10 days after it reached his desk), the bill will probably be reintroduced, says Newsome. And, she says, a passage next year with anywhere near the support it got this month would suggest that there would be enough votes to override a presidential veto.

- the Asbestos Hazardous Emergency Response Act of 1986, also adopted unanimously, both by the House on Oct. 1 and by the Senate on Oct. 3. This would give EPA a year to develop regulations on the inspection, abatement and disposal of asbestos for the estimated 30,000 primary and secondary schools that may pose an asbestos hazard to a total of 50 million children. Public and private schools would have 33 months to prepare their asbestos management plans. The bill would also require EPA to develop an accreditation program for asbestos abatement contractors, and have the National Bureau of Standards develop a complementary accreditation program for asbestos analysis labs. Finally, it would add \$100 million to the existing seven-year school asbestos-hazard-abatement loan program, now funded at \$600 million; loans repaid to the federal government would be entered into a new "trust fund" from which additional school loans could be issued. According to Rick Hind at the Washington, D.C.-based U.S. Public Interest Research Group, "The President has indicated that he thinks the bill is overly regulatory" and may not sign it. But, says Hind, in addition to the bill's unqualified support from the Congress, there apparently is "quiet support for the bill at EPA." — *J. Raloff*