tion of the Cu-Bi alloy into the superconducting state. This supposition was supported by the fact that switching on a magnetic field, at a temperature lower than the temperature of the drop, caused an increase of resistance, i.e., destroyed the superconductivity. Measurements on one specimen gave $dH_c/dT \approx 1000$ oe/deg.

On the basis of the results obtained, it can be concluded that a non-equilibrium phase formed at high overvoltages at the cathode undergoes a transition into a superconducting state at a temperature of about 2.2° K. An anneal at 120° C causes the decomposition of this phase, as a result of which superconductivity disappears. When the anneal is performed at a lower temperature (80° C), causing the decomposition of the second non-equilibrium phase, superconductivity is preserved. Thus, the second non-equilibrium phase is not responsible for the appearance of superconductivity in copper-bismuth deposits.

X-ray investigations of the copper-bismuth alloys obtained showed that unannealed specimens gave only weak diffuse rings, which can be taken as due to either high internal stresses or to the absence of long-range order in the system. An anneal at 120° C causes the decomposition of the non-equilibrium phase and the appearance on the x-ray photograph of reflections corresponding to the lattices of pure copper and bismuth. Further investigations will probably allow a more detailed explanation of the nature of the new non-equilibrium phase in the copper-bismuth system; however, it can be seen even now that the electrolytic method of obtaining metals under conditions of high overvoltage at the cathode allows phases to be obtained which are very far from equilibrium and which possess a number of new properties, amongst which, as follows from the account given, the appearance of superconductivity is possible.

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FORMATION OF THE ISOMER Cd^{115m} BY THE FISSION OF GOLD UNDER THE ACTION OF HEAVY IONS

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COMPOUND nuclei with large angular momentum are formed by the irradiation of the nuclei of the heavy ions C, N, and O. In the event of nuclear fission, their rotation causes an anisotropic angular distribution of the fission fragments,[1] and the degree of anisotropy increases with increasing angular momentum of the compound nucleus. Besides this, apparently, the increase of the angular momentum of the nucleus must influence the isomer yield of the fission fragments. It is of interest to determine, if only qualitatively, the dependence of the yields of some isomers among the fission fragments on the magnitude of the total angular momentum of the fissioning nucleus.

The dependence of the production cross sections of Cd^{115m} ($T_{1/2}$ = 43d, I = $^1/_2$) and of the isomer Cd^{115m} ($T_{1/2}$ = 43d, I = $^{11}/_2$) on the energy of incident particles was investigated by some workers in the fission of different nuclei by neutrons, protons, deuterons, and alpha particles.[2] A general tendency for increased isomer yield was observed with increased energy of the incident particle. But a more rigorous comparison of these data is difficult because of the necessity of accounting for the nuclear cascade in reactions with light fast particles.

The purpose of the present work has been the determination of the emission ratio of Cd^{115} and Cd^{115m} in the irradiation of gold by C^{12}, N^{14}, and O^{16} ions. The experiments were carried out with the 150 cm cyclotron at the Institute of Atomic Energy of the U.S.S.R. Academy of Sciences. The target was a gold foil 13 μ thick. The target was irradiated within the cyclotron chamber at radii of 67 and 61 cm, which correspond to 102 and 85 Mev for oxygen or 78 and 64 Mev for carbon. The target was irradiated with nitrogen ions at a radius of 67 cm (89 Mev). The ion current was 0.2 — 0.5 μa. The duration of irradiation was 2 — 3 hours. After irradiation, the foil was dissolved in aqua regia. To this were added carriers of cadmium, actinium, rubidium, silver, and iron in amounts of 15 mg. The CdS was separated from the solution. The chemical yield was determined by the weight

Reactions	$Au^{197} + O^{16}$		$Au^{197} + N^{14}$	$Au^{197} + C^{12}$	
Ion energies, Mev	102	85	89	78	64
l^2_{max}	2700	760	2060	1750	530
Emission ratio of Cd^{115} and Cd^{115m}	0.43	0.50	0.47	0.55	0.64

method after careful purification. The purity of the solution of cadmium was monitored by the β-particle half-life and energy. The measurement of the radiation intensity was taken by an end-window Geiger counter (MSG-17). The thickness of the CdS layer deposited from the filter paper onto a backing was ~ 10 mg/cm^2. The variation of the thickness of the layer of CdS from experiment to experiment, $2-3$ mg/cm^2, need not have a considerable effect on the scattering and self-absorption of β radiation.[3] It is also necessary to note that in all our experiments, apparently, a considerable quantity of Ag^{115} ($T_{1/2} = 20$ min.) was formed, which decays 90%[4] to Cd^{115} by β emission. After irradiation, the foil was kept intact for a sufficiently long time for the full decay of Ag^{115}. Additional experiments showed that approximately 30% of Cd^{115} was formed as a result of Ag^{115} decay.

The results of the principal experiments are presented in the table (the given data are uncorrected for the formation of Cd^{115} from Ag^{115}).

The table lists also the computed l^2_{max} for the corresponding reactions (l^2_{max} is the maximum orbital momentum of the ion at which fusion of the impinging nuclei arises). It is apparent that with a change of l^2_{max} from 500 to 3000, the emission ratio of Cd^{115} and Cd^{115m} changes very slightly.

In conclusion we consider it our pleasant duty to thank corresponding member of the Academy of Sciences U.S.S.R. G. N. Flerov for guidance in this present work.

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LATERAL DISTRIBUTION FUNCTION OF THE FLUX OF CHARGED PARTICLES IN AN INDIVIDUAL EXTENSIVE ATMOSPHERIC SHOWER

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THE apparatus in operation at the Moscow State University for an all-out investigation of extensive atmospheric showers (EAS) makes it possible to investigate the individual characteristics of each recorded shower. In this note we report experimental data on the lateral distribution functions of the flux density of charged particles up to 25 meters from the shower axis. To obtain these data, we used a hodoscope with a large number of Geiger-Müller counters and a core detector consisting of ionization chambers arranged in two rows.[1] The first row of ionization chambers, shielded with lead, is used to determine the distribution of the energy flux carried by the electron-photon component near the shower axis. A direct examination of the distribution of the energy flux in the first row of ionization chambers makes it possible to determine the position of the shower axis for showers with a sufficient number of particles, with accuracy on the order of the chamber dimensions (25 cm). The hodoscopic counters were used to determine the flux density of the charged particles at different distances from the shower axis. To investigate the lateral-distribution functions of the flux density of the charged particles in an individual shower, we selected 26 of the densest showers (with $N \geq 10^5$), whose axes fall in the first row of the ionization chambers, for only in such showers can the charged-