

Black holes and the German Reichstag

One day a couple of years ago I was attending a meeting of the German Astronomical Society in Berlin, when I was gripped with an almost irrepressible sense of inner unrest. There was no other option – I simply had to leave the lecture halls of the Technical University and enjoy the gorgeous day outside. Before I left, however, I carefully taped my poster to the wall between the entrances to the men’s and women’s toilets, which seemed the perfect spot for it. Every congress delegate would now be forced – subliminally at least – to notice my creation.

After leaving the university buildings, I first soaked up the summer sunshine in the zoological gardens before heading towards the Reichstag – the home of the German parliament. As I did so, my thoughts wandered off in a different direction. What a waste of time, it occurred to me, all those boring lectures are. What physics desperately needs, I reasoned, is a new and exciting way of presenting the subject.

Unfortunately, modern physics is impossible to comprehend using intuition alone. How can bizarre concepts such as the curvature of space–time or the event horizon of a black hole be understood? What possible imagery could help non-scientists to grasp the significance and vital importance of some of the major insights of theoretical physics? Finding a simple way of conveying those ideas seemed an impossible task.

Lost in thought, I looked up and realized I had almost reached my desired destination as the modern glass dome of the newly constructed core of the Reichstag building swung into view. As I examined the dome more closely, I noticed it contained a huge funnel on the inside. To my amazement, the funnel looked exactly like the diagrams used in textbooks to illustrate the curvature of a black hole, in which space–time is embedded in an abstract, 3D Euclidean space to form a “space–time funnel”.

In fact, I suddenly saw further similarities between German politics and black holes. The centre of a space–time funnel, which is a true mathematical singularity, contains an infinite concentration of energy. Similarly, the Reichstag contains the highest concentration of German politicians. Inspired by my lateral thoughts, I decided to join the queue of visitors and enter the Reichstag itself.

As I watched the play of colour on the dome created by light from the setting Sun, it occurred to me that while space–time funnels are often used to visualize black holes, they do not actually shed much light on the really important characteristics of these strange entities. In particular, if you remain a safe distance from a black hole and watch something falling in to it, you will notice that the object never reaches the hole’s centre. It appears to come to a stop – to freeze – at a certain distance from the centre, known as the event horizon.

I finally reached the front of the queue, passed security, took the lift and walked along the spiral path that runs along the inside of the dome. As I gazed into the massive funnel with its reflecting surface, I noticed that it ends right in the centre of the dome in the debating chamber, where Chancellor xxx [insert pending election on 18/9] and his/her cronies discuss Germany’s future.

Members of the public, however, cannot enter this inner sanctum. They can only get as far as a circular barrier from where they can peer down to the bottom of the funnel.



The funnel looks exactly like the diagrams used to illustrate the curvature of a black hole

Along the barrier are displayed various photographs of decisive events in German history that are designed to remind visitors of their responsibilities to the future. They are a warning against forgetfulness and against the repression of the Nazi era.

Suddenly I saw the significance of the information frozen on the pictures. Just as the politicians sit in the inner area of the black hole from which no useful information ever escapes, so the pictures represent external information that has become trapped in the hole itself. I now saw the endless parliamentary debates about Germany’s budget deficit in a whole new light.

Smiling, I took leave of the event horizon of German history and got into a lift. The inside is lined with mirrors, so that passengers can see themselves infinitely reflected. This space of infinitely recurring images curves toward the centre of the Reichstag. The lift must therefore be located in the “photon sphere” of the black hole, which is the last stable orbit of light.

I then left the Reichstag building and headed for the Brandenburg Gate, the former dividing line between east and west Berlin. As I sauntered through the gate, I noticed an area of land to my right that was entirely vacant except for some statues of bears, which are the symbol of the city of Berlin. About 60 bears were arranged in a circle, each representing a country of the world by virtue of the images printed on it.

One bear, however, stood off to one side, apart from all the others. Its surface bore an image of Einstein and a quotation by the great physicist, who rose to fame while working in Berlin. As a guide explained to a group of tourists that an American embassy would soon be built on the site, I read Einstein’s timeless words: “Peace cannot be kept by force. It can only be achieved by understanding.” I hope that politicians in the Reichstag and diplomats in the embassy will heed the great man’s words.



Matthias Hanauske is completing his PhD on the properties of compact stars at the University of Frankfurt, Germany, e-mail hanauske@wiwi.uni-frankfurt.de