Appendix 4: Pictures of prime numbers for real non-UFD

The pictures show the quadratic character and a picture of prime numbers and units for some complex quadratic fields whose domain of integers is not a unique-factorization domain, namely of class numbers, h, as indicated

the fields of discriminant congruent 0 modulo 4:

h = 2: Q(√10), Q(√15), Q(√26), Q(√30), Q(√34), Q(√35), Q(√39), h = 3: Q(√79), h = 4: Q(√82)

and the fields of discriminant congruent 1 modulo 4:

h = 2: Q(√65), Q(√85), Q(√105), h = 4: Q(√145), h = 3: Q(√229), Q(√257).

At the top, each picture mentions the field, $\mathbb{Q}(\sqrt{r})$, and displays its quadratic character (as far as space allows).

In the pictures, rational integers are placed on the x-axis and numbers of the form √r times rational integers on the y-axis.

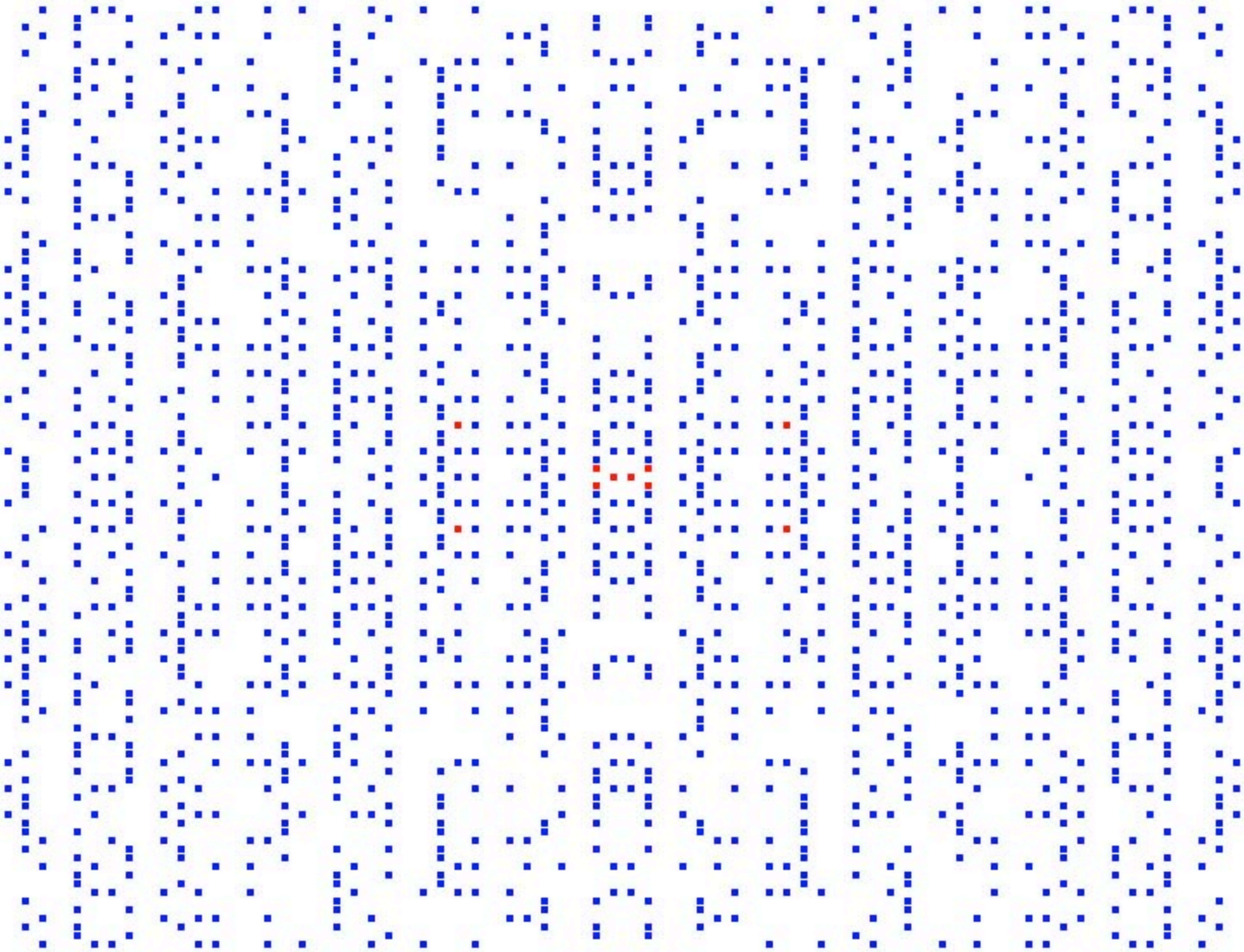
When d ≡ 0 modulo 4, we use a square grid, otherwise a staggered grid, where the grid points form roughly equilateral triangles.

The pictures display the prime numbers, which generate the principal prime ideals, but not those irreducible numbers which are not prime.

Moreover, the non-principal prime ideals are not displayed (see, however, appendices 6 and 8).

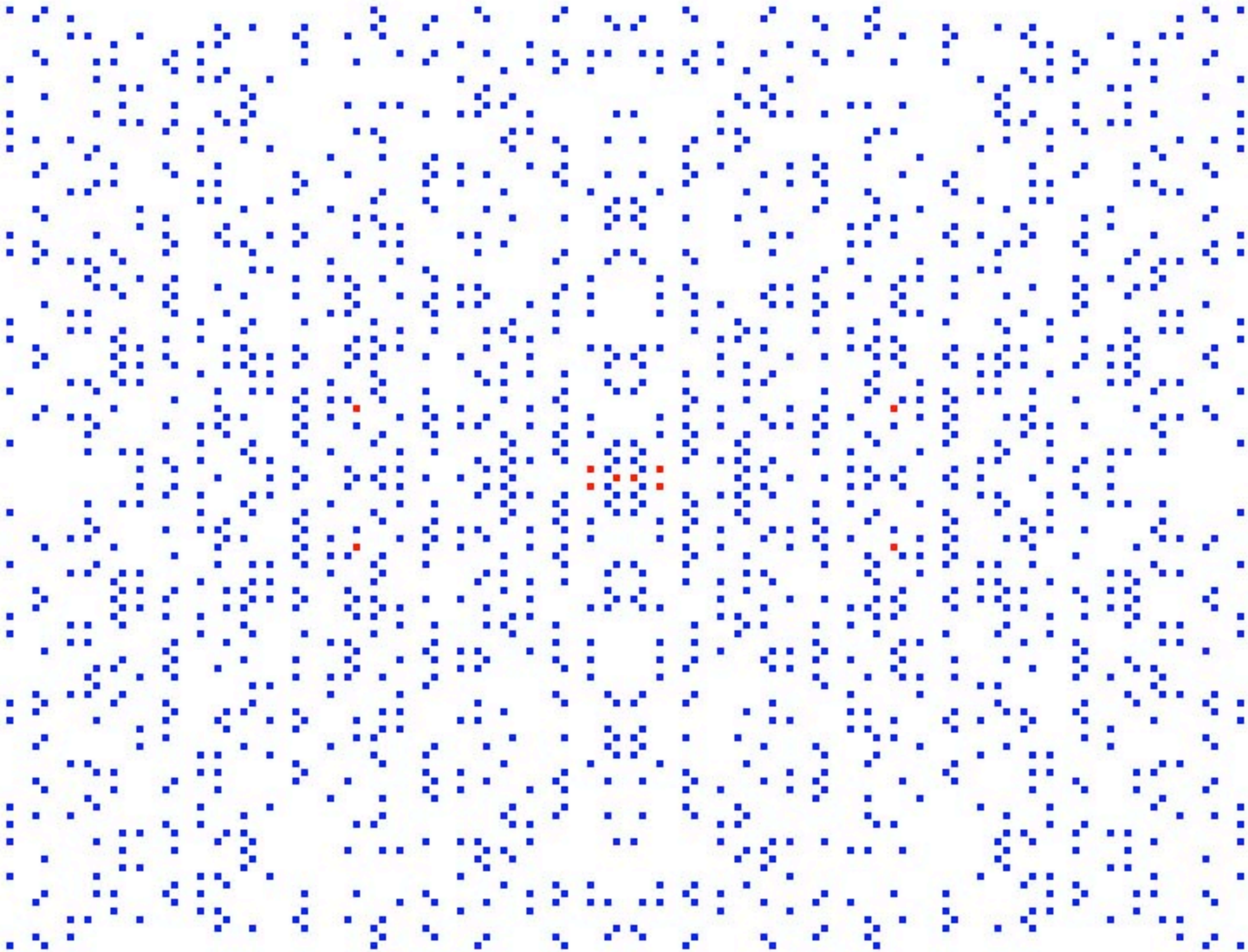
$Q(\sqrt{10})$ chi prime numbers units

0+0+000-0+0-0+000-0-0-0-000+0-0+0-000+0+



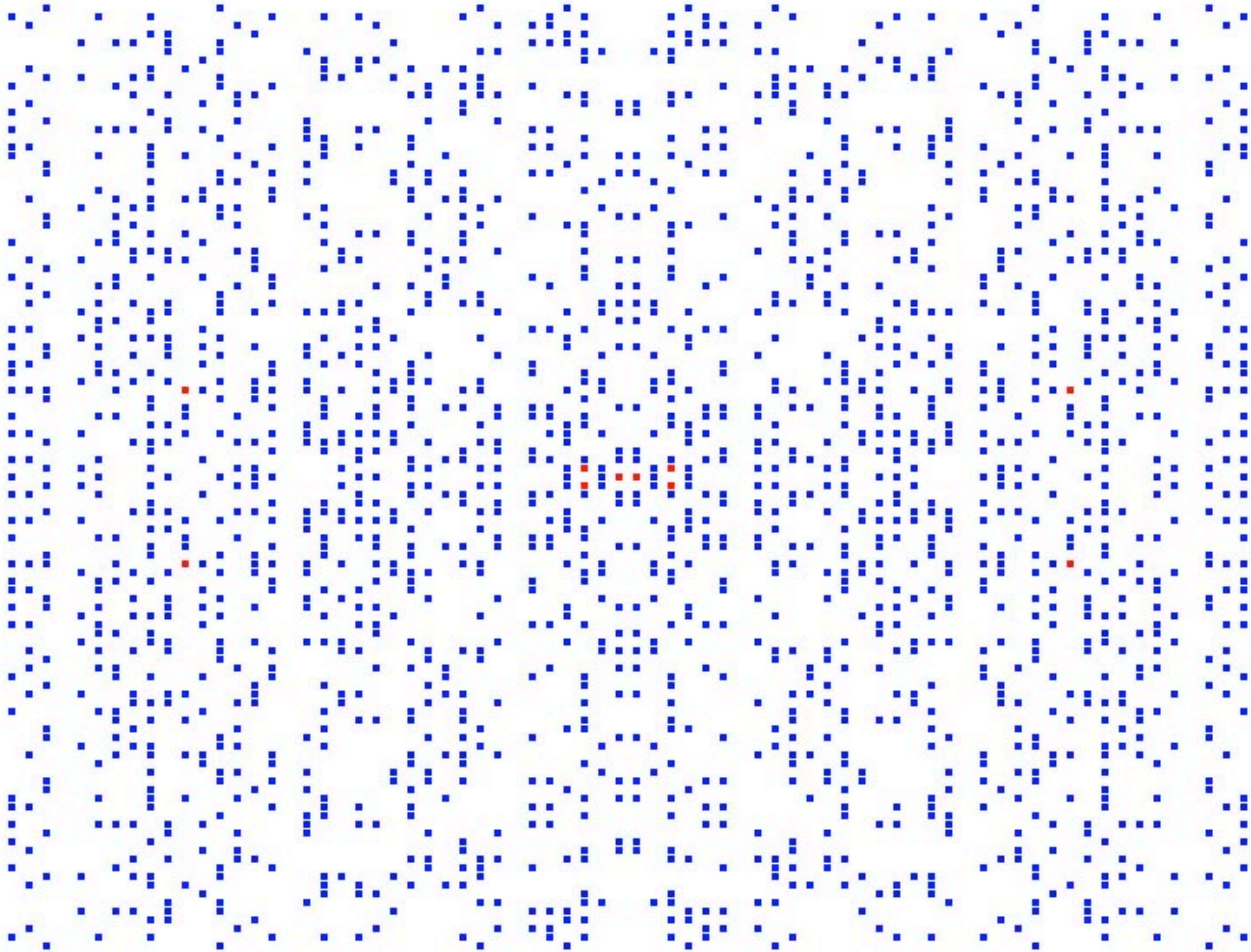
Q(√15)   chi   prime numbers   units

0+00000+000+0-000+0-000-00000-0-00000-000-0+000-0+000+00000+



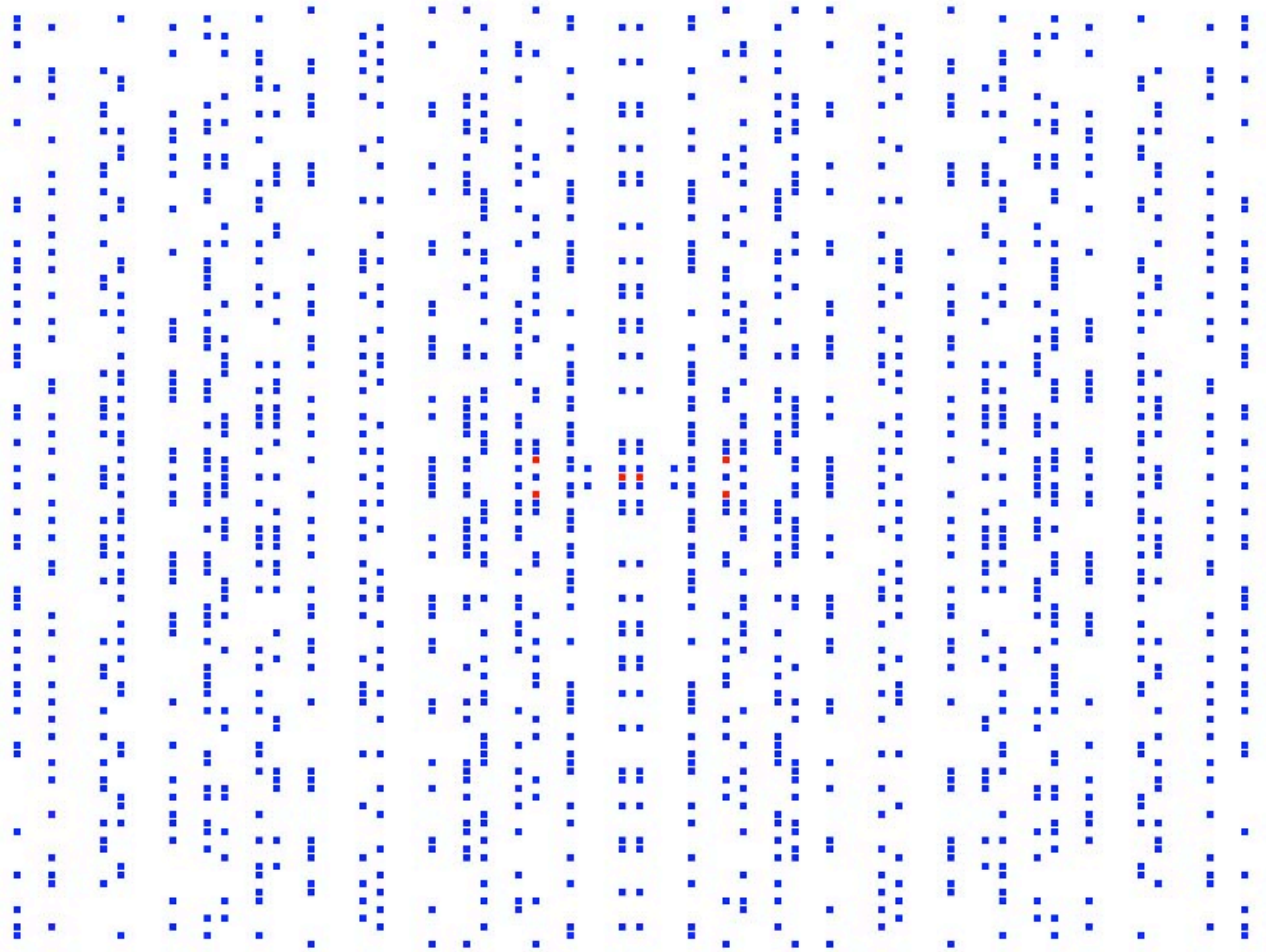
Q(√26)   chi   prime numbers   units

0+0-0+0-0+0+000-0+0+0+0+0+0-0-0-0-0-0+000-0-0+0-0+0-0-0+0-0+0-0-000+0-0-0-0-0-0+0+0+0+0+0-000+0+0-0+0-0+



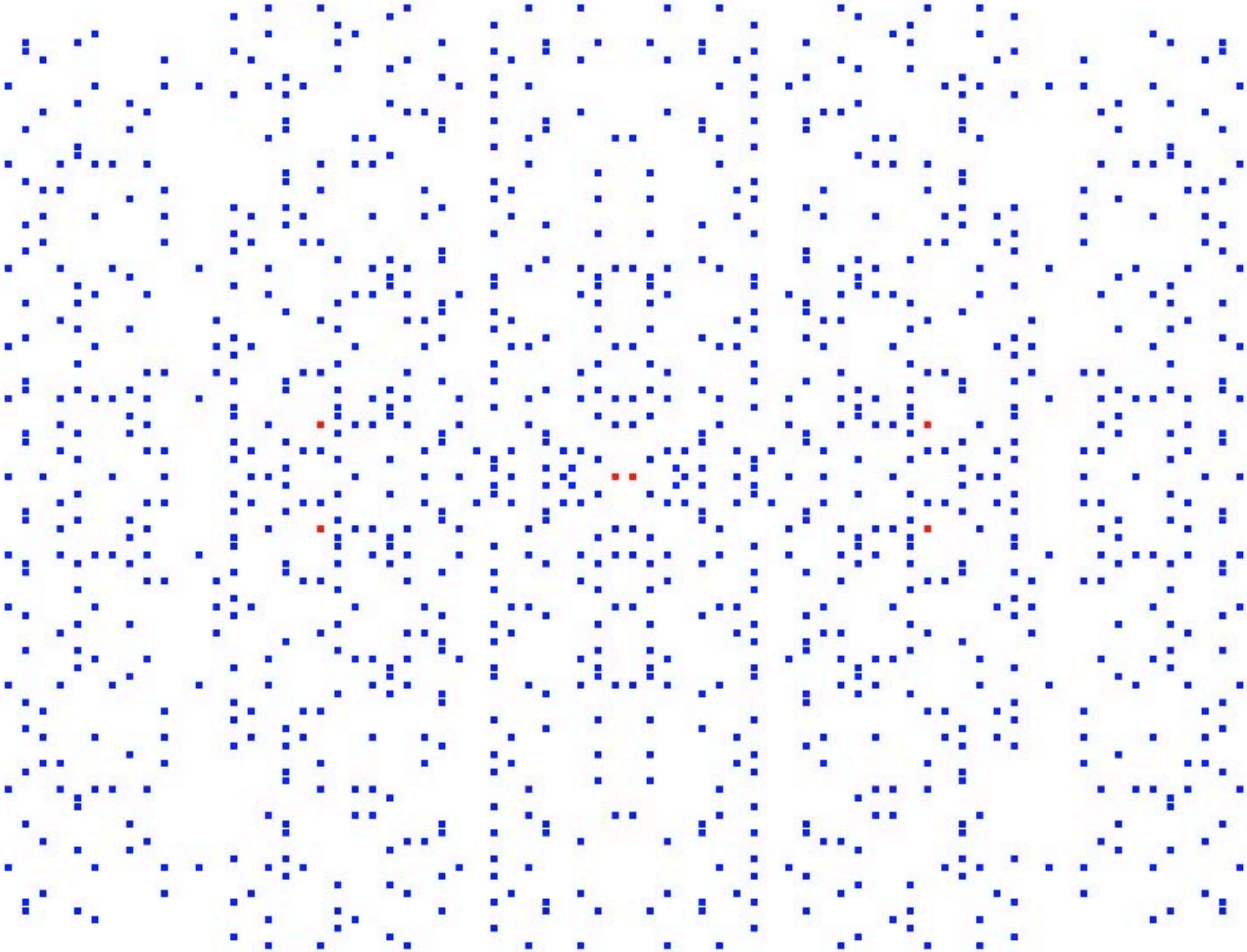
Q(√30) chi prime numbers units

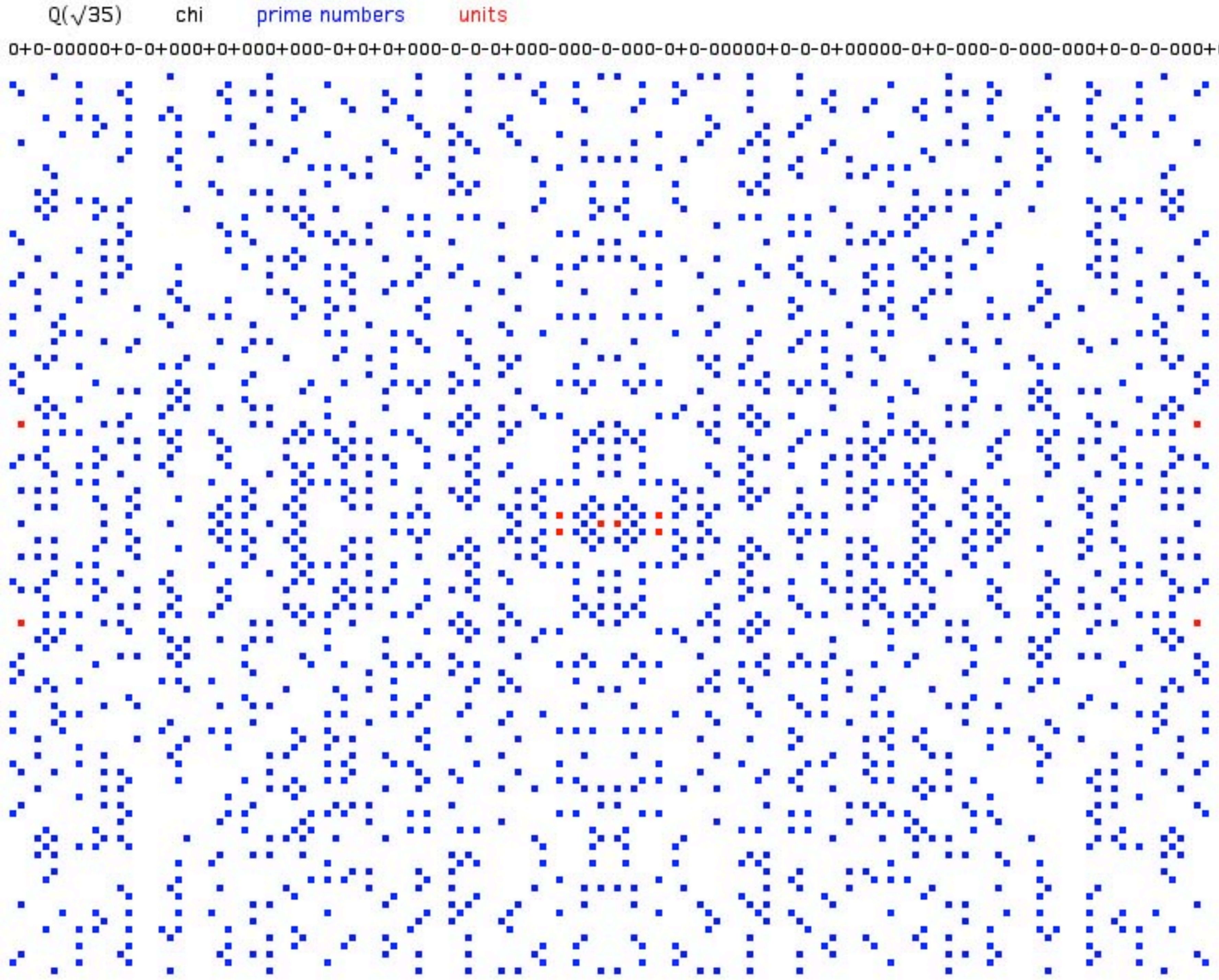
0+00000+000-0+000+0+000-00000+0-00000+000-0-000-0+000-00000-0-00000-000+0-000-0-000+00000-0+00000-000+0+000-



Q(√34)   chi   prime numbers   units

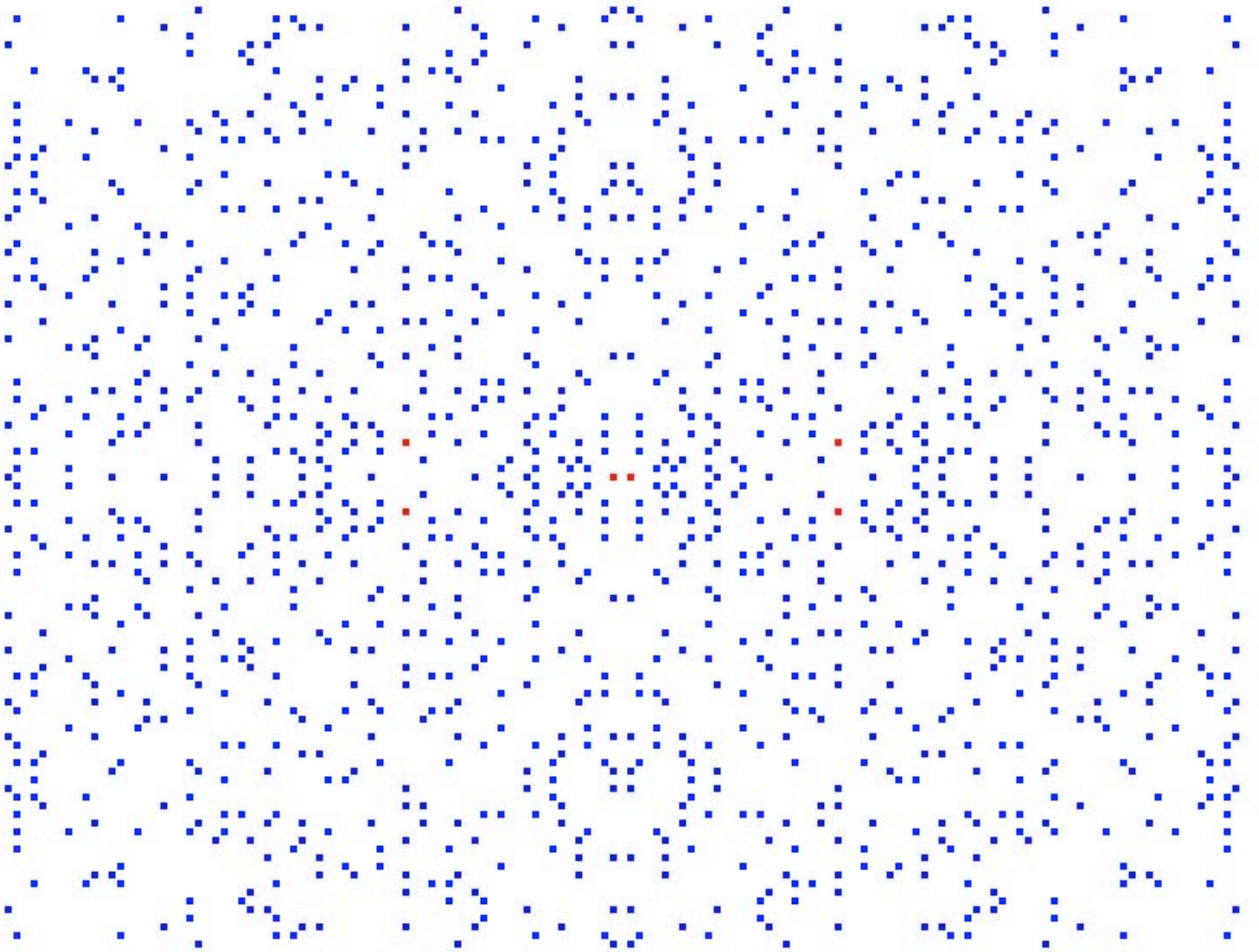
0+0+0+0-0+0+0-0+000-0-0-0+0+0+0-0+0-0+0-0-0-0+0+0+000-0+0-0-0+0-0-0-0-0-0-0+0-0-0+0-000+0+0+0-0-0-0+0-0+0-0+0




Q(√35)
chi
prime numbers
units
0+0-00000+0-0+000+0+000+000-0+0+0+000-0-0-0+000-000-0-000-0+0-00000+0-0-0+00000-0+0-000-0-000-000+0-0-0-000+

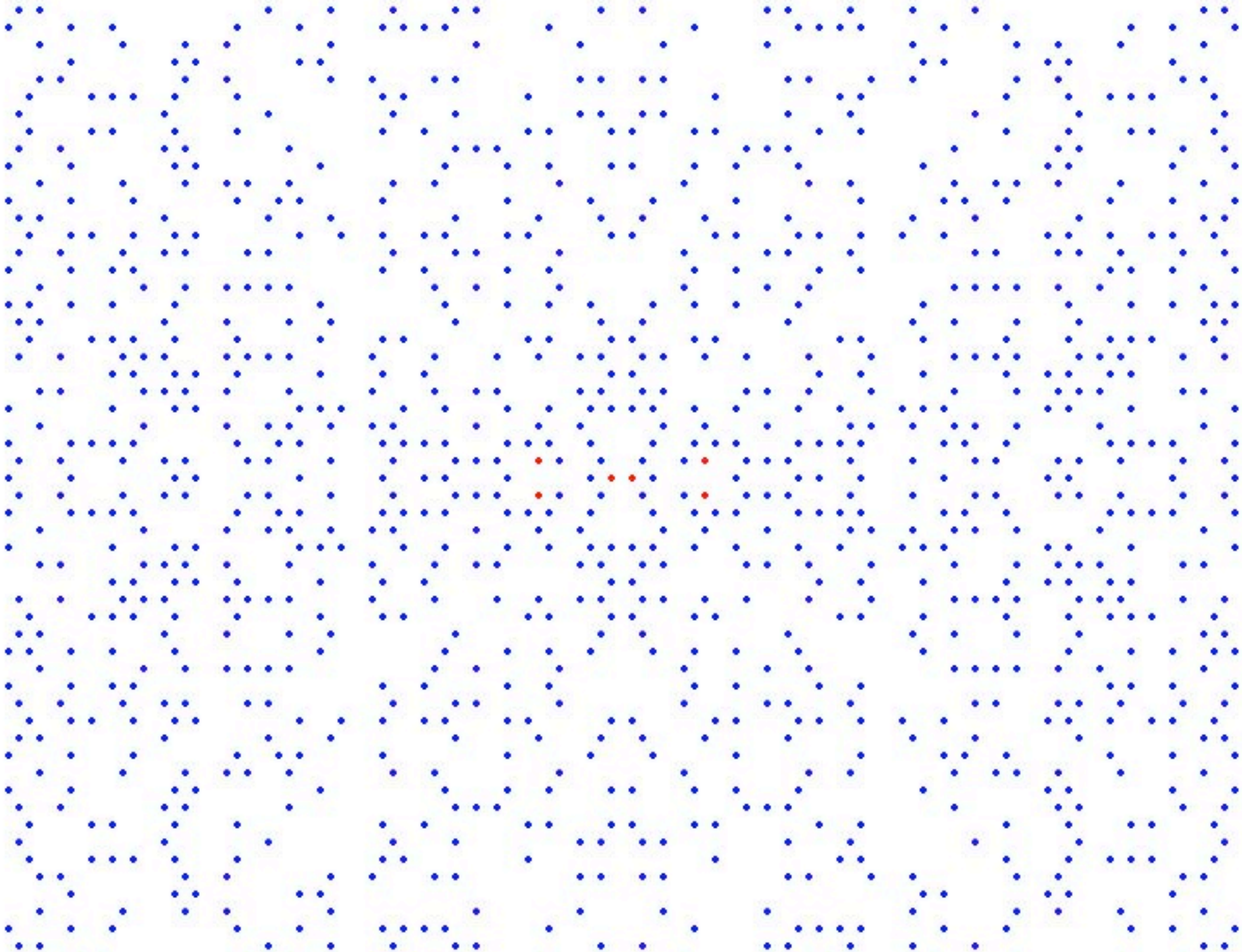
Q(√39) chi prime numbers units

0+000+0+000-00000-0+000+0+000-0+000+0-000+0-000-0+000-0-000-0+00000+000-0-000-0-000-0-000+00000+0-000-0-000+



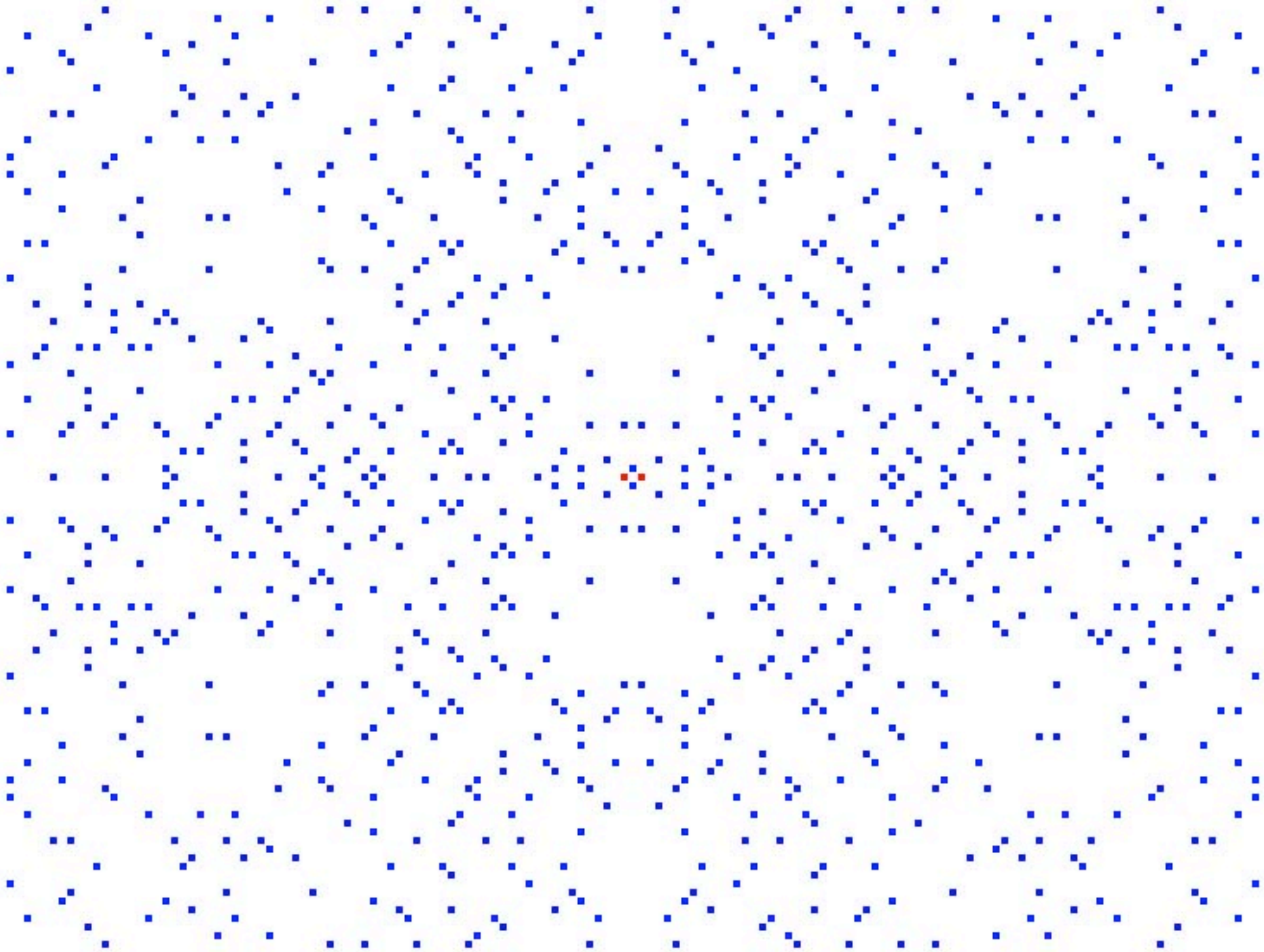
$\mathbb{Q}(\sqrt{65})$ chi prime numbers units

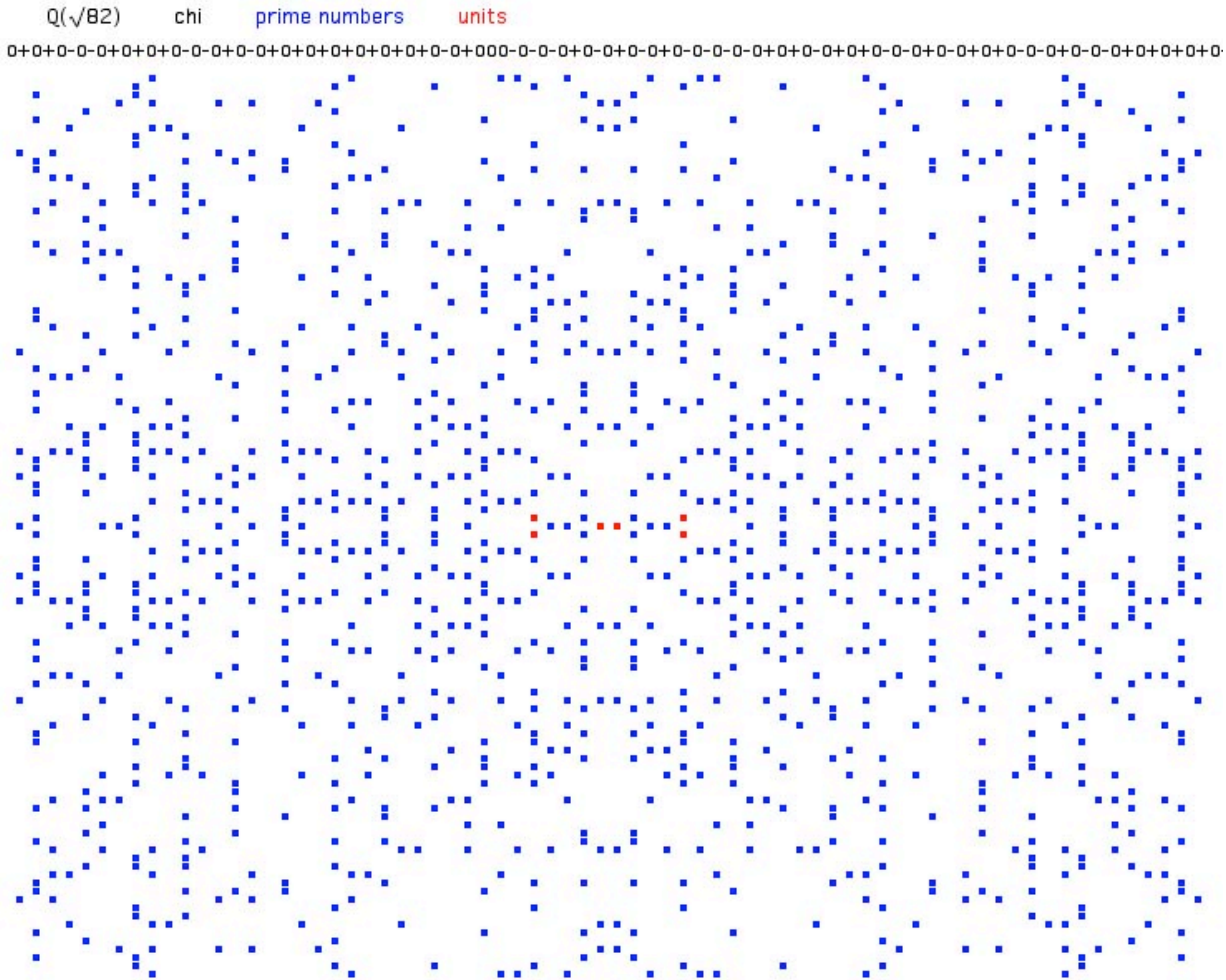
0++-+0-+++0--0+0+-+-0----00-++0-++-0++-00----0-+-+0+0--0+++-0+-++



Q(√79) chi prime numbers units

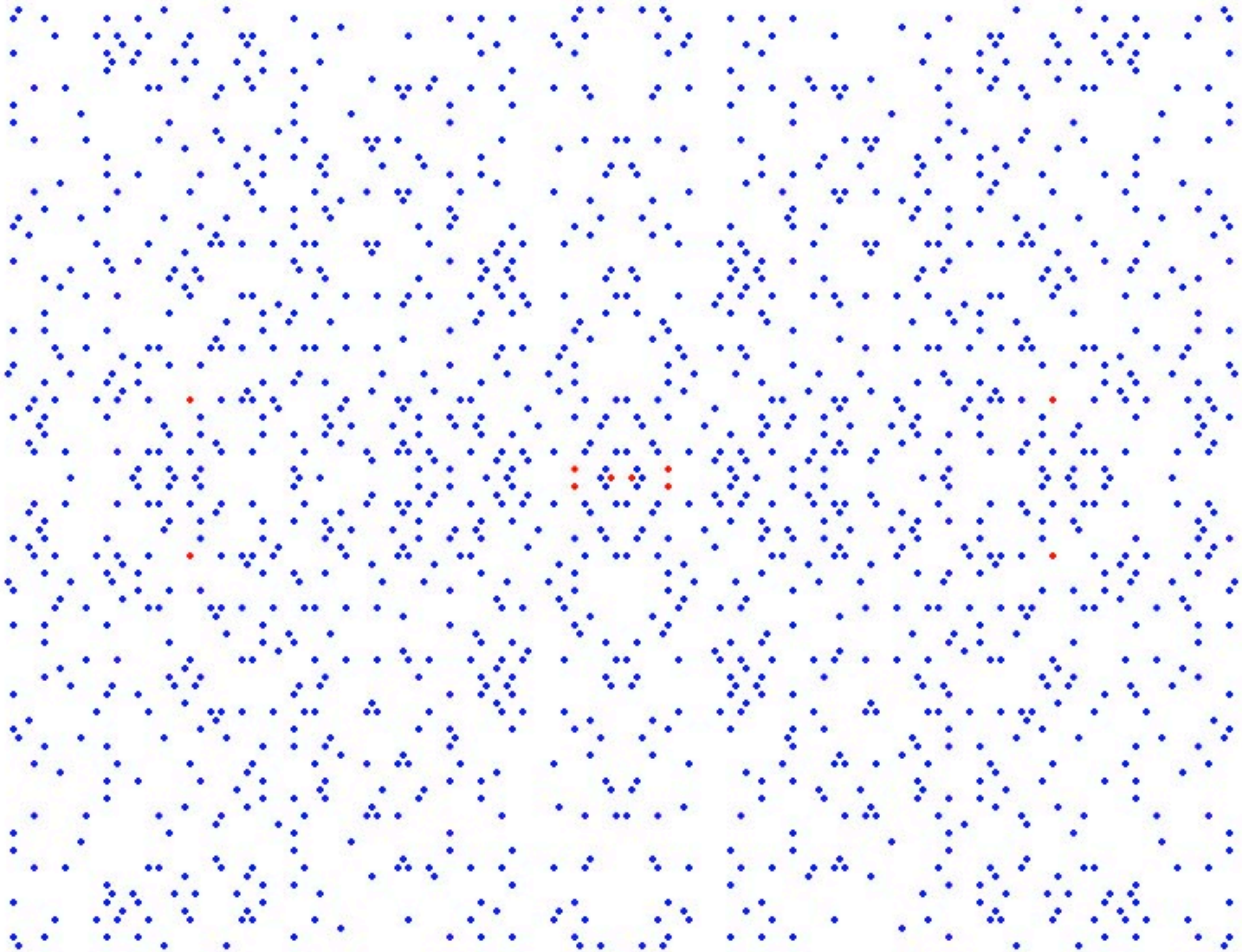
0+0+0+0+0+0-0+0+0-0-0+0-0+0+0-0-0-0+0-0+0-0+0+0+0+0-0-0-0-0+0-0+0+0-0-0+0+0+0-000+0-0-0-0+0+0-0-0+0-0+0+0+0

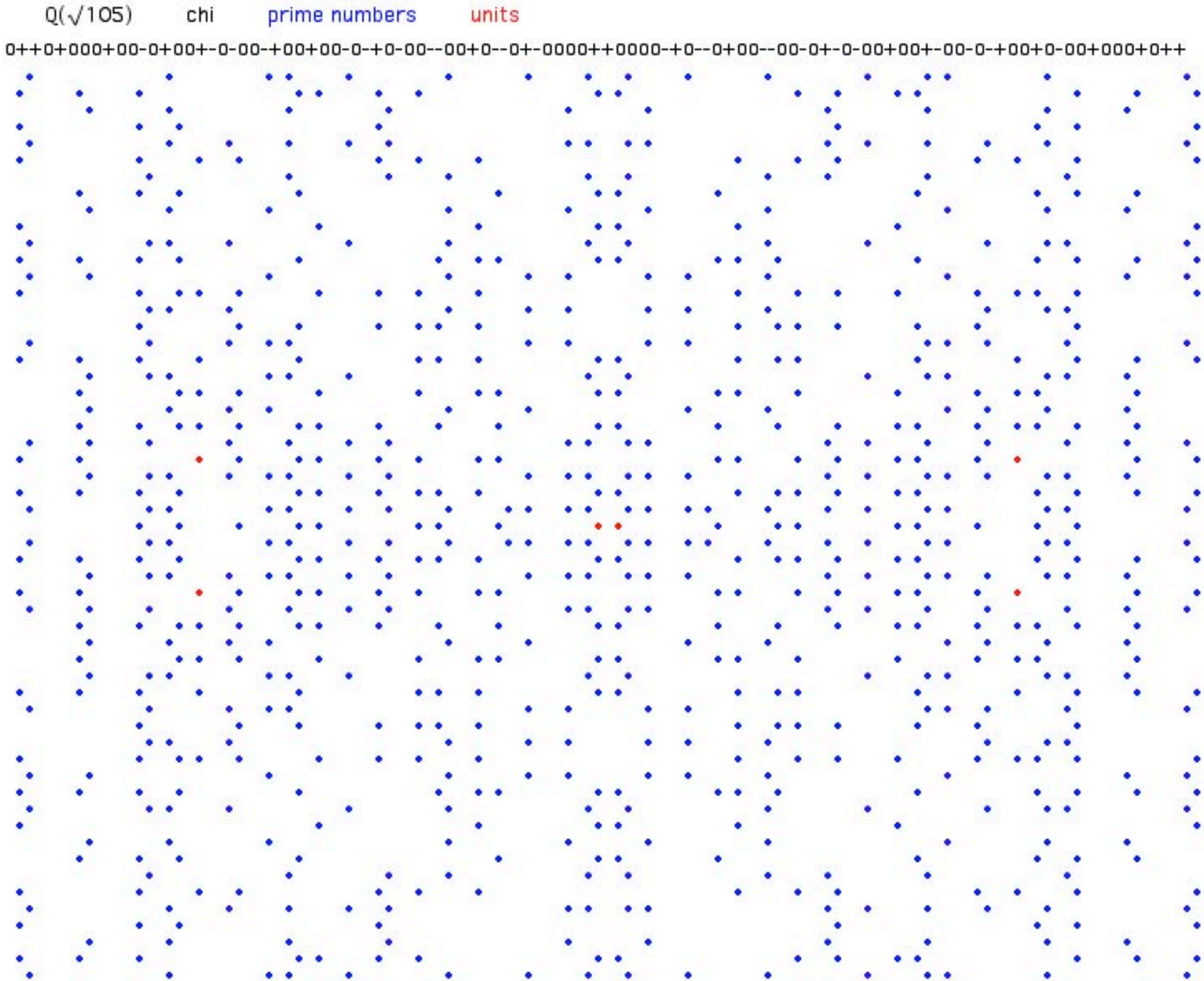


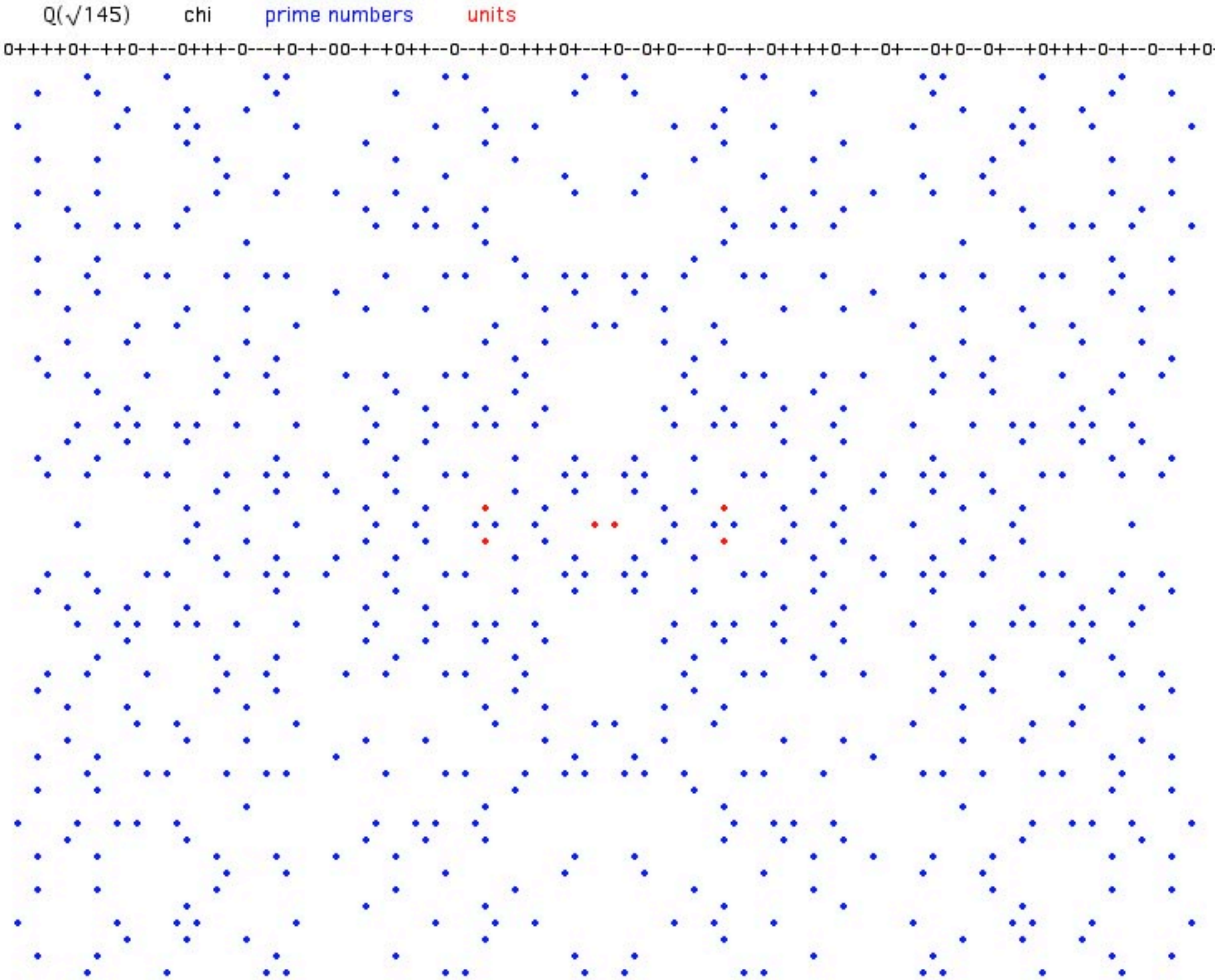

Q(√82)
chi
prime numbers
units
0+0+0-0-0+0+0+0-0-0+0-0+0+0+0+0+0+0+0-0+000-0-0-0+0-0+0-0+0-0+0-0-0-0-0+0+0-0+0+0-0-0+0-0+0+0-0-0+0-0-0+0+0+0+0

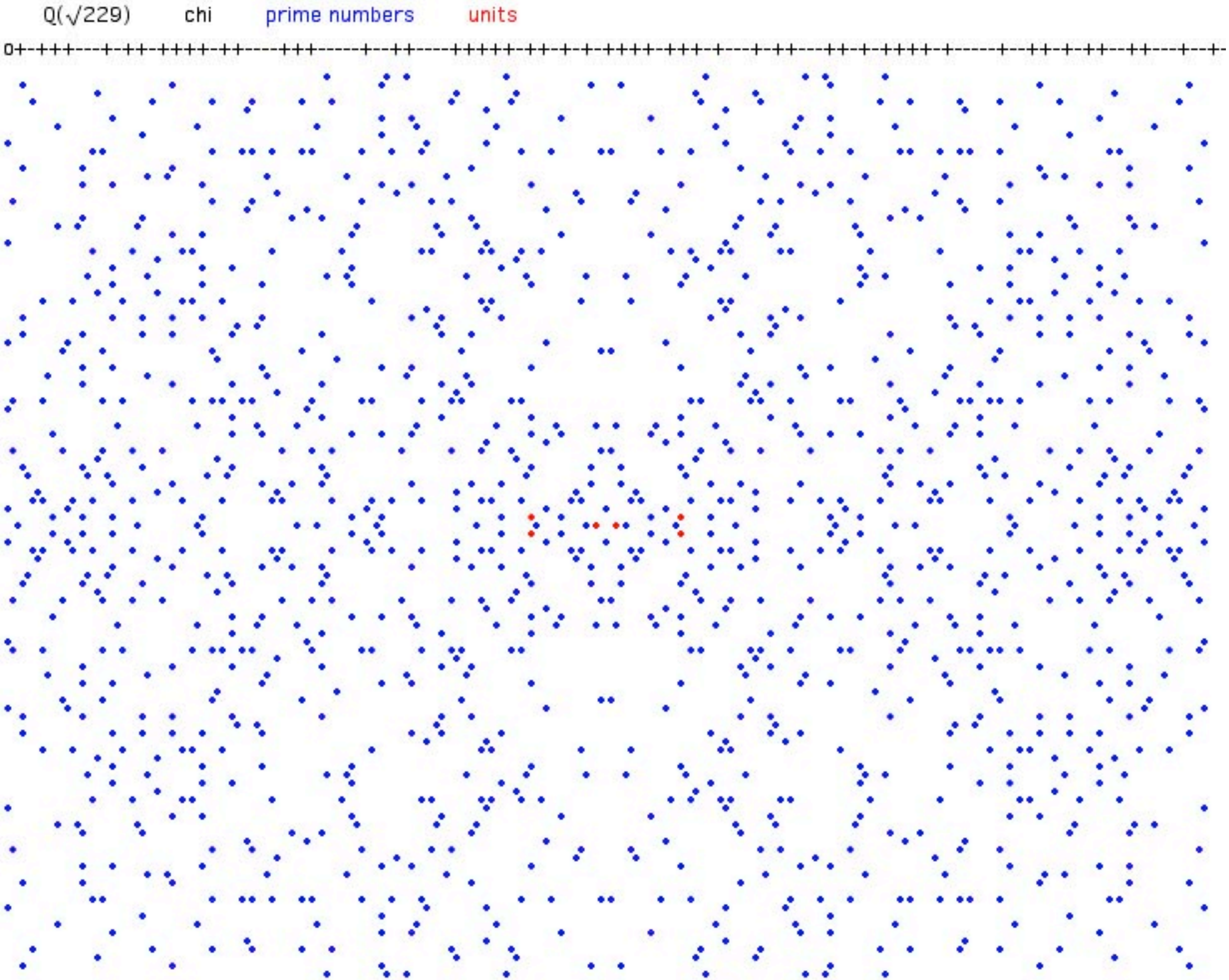
Q(√85) chi prime numbers units

0+-++0-+-+0-+--0+0-+0+++-0+++-0---00++--0----0--++00---0-+++0-+++0+-0+0--+-0+-+-0++-+




Q(√105)
chi
prime numbers
units
0++0+000+00-0+00+-0-00-+00+00-0-+0-00--00+0--0+-0000++0000-+0--0+00--00-0+-0-00+00+-00-0-+00+0-00+000+0++


Q(√145)
chi
prime numbers
units
0++++0+-++0-+--0+++-0---+0-+-00-+-+0++--0--+-0-+++0+--+0--0+0---+0--+-0++++0-+--0+---0+0--0+--+0+++-0-+--0--++0


Q(√229)
chi
prime numbers
units

Q($\sqrt{257}$) chi prime numbers units