

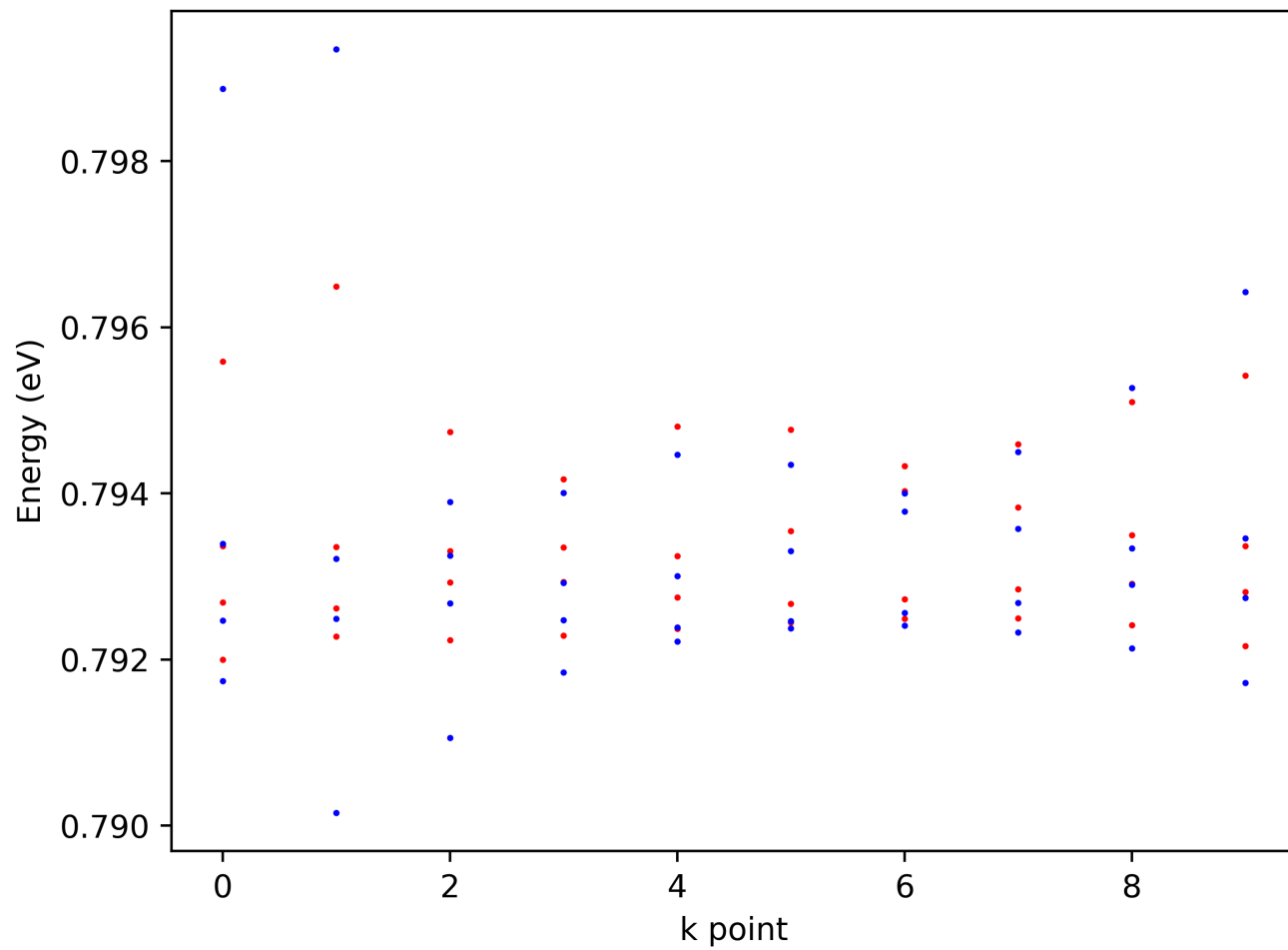
Magnetic Field

(p, q)	Magnetic Field (T)
(1, 2)	14.14
(1, 3)	9.42
(1, 4)	7.06
(1, 5)	5.64
(1, 6)	4.71
(1, 7)	4.04
(1, 8)	3.53
(1, 9)	3.14
(1, 10)	2.83

Eigen Value Project, Valley -1, p = 1

$$q = 2$$

red points for eigen value, blue point for eigen value project, valley:-1



dmesh loaded shape: (10, 800, 800)

eigen val hamk: [0.7919965 0.79269074 0.7933656 0.79558795]
eigen val ham proj: [0.79174357 0.79246983 0.79339574 0.7988682]

eigen val hamk: [0.79227932 0.79261662 0.79335797 0.79649237]
eigen val ham proj: [0.790155 0.79249098 0.79321297 0.79934684]

eigen val hamk: [0.79223438 0.79293003 0.79330672 0.79473882]
eigen val ham proj: [0.79105529 0.79267854 0.79325186 0.79389493]

eigen val hamk: [0.79228877 0.79293304 0.79334878 0.79417327]
eigen val ham proj: [0.79184427 0.79247314 0.79292288 0.79400689]

eigen val hamk: [0.7923718 0.79274688 0.79324687 0.79480601]
eigen val ham proj: [0.79221574 0.79238911 0.79300353 0.79446905]

eigen val hamk: [0.79244677 0.79267254 0.79354504 0.79476871]
eigen val ham proj: [0.79237891 0.79246169 0.79330786 0.79434633]

eigen val hamk: [0.79249008 0.79272733 0.79402622 0.79432786]
eigen val ham proj: [0.79240733 0.79256137 0.79378342 0.7939992]

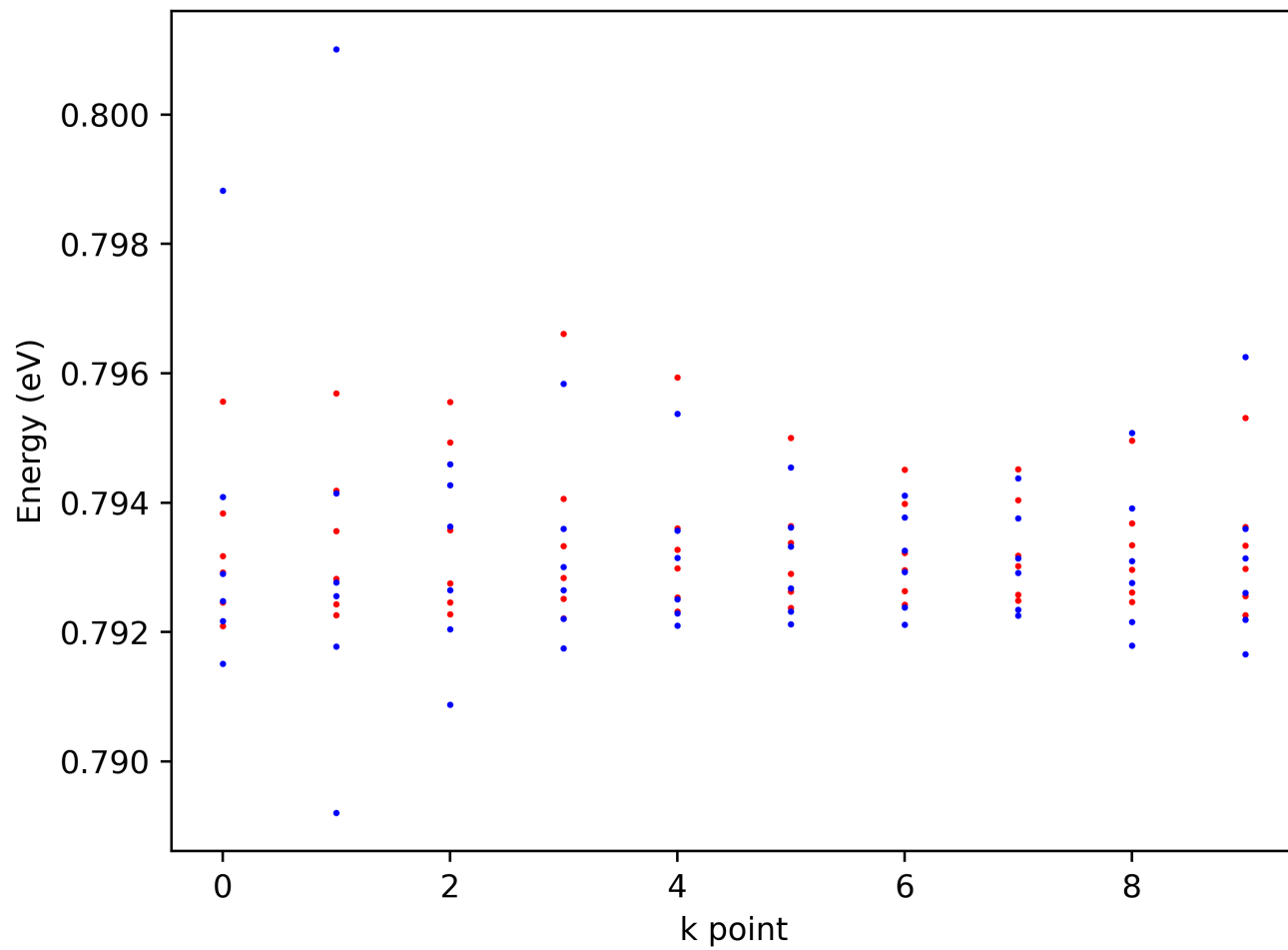
eigen val hamk: [0.79249853 0.79284502 0.79383365 0.79459103]
eigen val ham proj: [0.79232637 0.79268273 0.79357602 0.79450077]

eigen val hamk: [0.79241673 0.79291073 0.79349635 0.7950988]
eigen val ham proj: [0.79213531 0.79290085 0.793341 0.79526874]

eigen val hamk: [0.79216461 0.7928144 0.79336763 0.79541986]
eigen val ham proj: [0.79171756 0.79274557 0.79346113 0.79642395]

q = 3

red points for eigen value, blue point for eigen value project, valley:-1



n_moire: 30 , equals anlgle (degree) 1.0845490491577974

n_moire: 30 , equals anlgle (degree) 1.0845490491577974

dmesh loaded shape: (10, 1200, 1200)

eigen val hamk: [0.79208923 0.7924579 0.7929184 0.79317674 0.79383635 0.79556279]

eigen val ham proj: [0.79150515 0.7921697 0.79247658 0.79290131 0.79409036 0.79882696]

eigen val hamk: [0.79225726 0.79242603 0.79282186 0.79356267 0.79418312 0.79569043]

eigen val ham proj: [0.78920323 0.79177562 0.79255343 0.79276848 0.79414332 0.80101113]

eigen val hamk: [0.79227337 0.79245594 0.79275109 0.79357411 0.79492815 0.79555877]

eigen val ham proj: [0.79087817 0.79204117 0.79264884 0.79363467 0.79427359 0.79459087]

eigen val hamk: [0.79221402 0.79251019 0.79283467 0.79332785 0.79406184 0.79660976]

eigen val ham proj: [0.79174631 0.79220676 0.79264843 0.79300896 0.79359843 0.7958351]

eigen val hamk: [0.79231435 0.79253152 0.79298225 0.79327347 0.79360619 0.79593654]

eigen val ham proj: [0.79209577 0.79228649 0.79250994 0.79314277 0.79356646 0.79537157]

eigen val hamk: [0.79237248 0.79262852 0.79290218 0.7933777 0.79363764 0.79500421]

eigen val ham proj: [0.79212045 0.79231879 0.79267521 0.79332061 0.79361903 0.7945459]

eigen val hamk: [0.79242157 0.79263213 0.7929567 0.79322404 0.79398456 0.79450739]

eigen val ham proj: [0.79211009 0.79238205 0.79293062 0.79325543 0.79376994 0.79410707]

eigen val hamk: [0.79248399 0.7925782 0.79302255 0.79317871 0.79404192 0.79451892]

eigen val ham proj: [0.79225468 0.79234771 0.79291717 0.79314039 0.79375659 0.79437947]

eigen val hamk: [0.7924613 0.79261513 0.79296516 0.79333987 0.79368307 0.79495936]

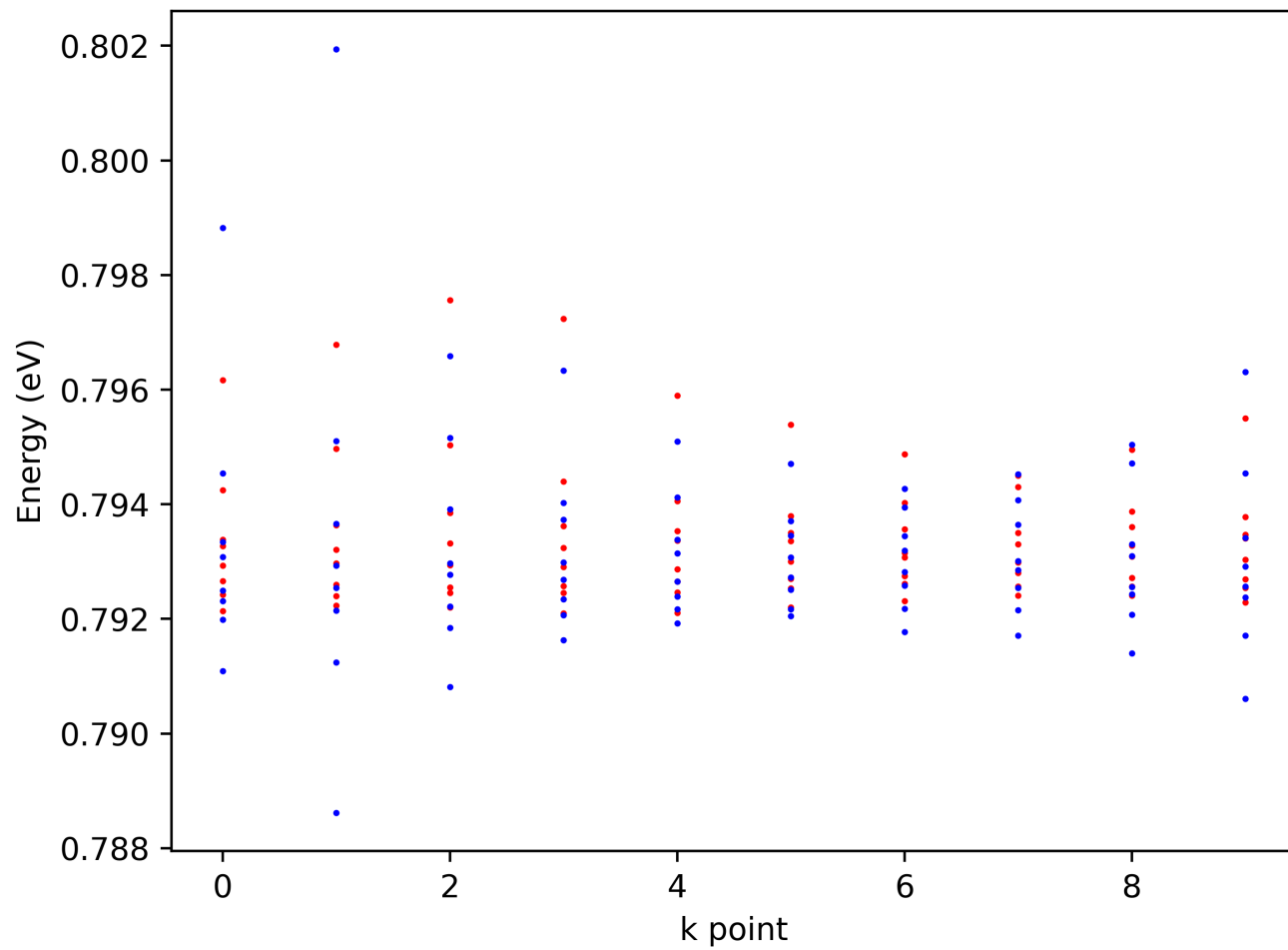
eigen val ham proj: [0.7917882 0.79215568 0.79276224 0.79309459 0.79391251 0.79507975]

eigen val hamk: [0.79226134 0.79255684 0.79298006 0.79333635 0.79362482 0.79531088]

eigen val ham proj: [0.79165886 0.79219148 0.79260793 0.79313668 0.79359316 0.79625274]

q = 4

red points for eigen value, blue point for eigen value project, valley:-1



n_moire: 30 , equals anlgle (degree) 1.0845490491577974

n_moire: 30 , equals anlgle (degree) 1.0845490491577974

dmesh loaded shape: (10, 1600, 1600)

eigen val hamk: [0.79213627 0.79242322 0.792664 0.79293538 0.79327558 0.79338693
0.79424677 0.79617012]

eigen val ham proj: [0.7910921 0.79198959 0.79231536 0.79249881 0.7930822 0.79334653
0.79454485 0.79882147]

eigen val hamk: [0.79223398 0.79239945 0.79259627 0.79296752 0.79320535 0.79363609
0.79496972 0.79678419]

eigen val ham proj: [0.78861787 0.79124179 0.79214532 0.79254607 0.79293271 0.79366374
0.79510809 0.80193946]

eigen val hamk: [0.79220454 0.7924574 0.79255405 0.79294234 0.79332266 0.7938484
0.79503523 0.79756083]

eigen val ham proj: [0.79081748 0.79184397 0.79222144 0.79277383 0.79296964 0.79391841
0.79515772 0.79658994]

eigen val hamk: [0.79209581 0.79245528 0.7925741 0.79291168 0.79323965 0.79362423
0.79439752 0.79723839]

eigen val ham proj: [0.79162764 0.79206621 0.79234758 0.79268641 0.79298479 0.79373614
0.79402675 0.79633168]

eigen val hamk: [0.79210763 0.79246148 0.79265471 0.79286788 0.79336734 0.79353074
0.79405487 0.7958995]

eigen val ham proj: [0.7919266 0.79217094 0.79239613 0.79265185 0.79314566 0.79338731
0.79411741 0.79509896]

eigen val hamk: [0.79220303 0.79253243 0.79270163 0.7930011 0.79336224 0.79350067
0.79379305 0.79538965]

eigen val ham proj: [0.79204868 0.79216757 0.79251245 0.79272426 0.79307364 0.7934577
0.79370981 0.79470715]

eigen val hamk: [0.79231568 0.79261499 0.79274721 0.79307431 0.79315711 0.79356194
0.79402367 0.79487675]

eigen val ham proj: [0.79177169 0.79217662 0.79258332 0.79282231 0.79319042 0.79345088
0.7939452 0.79427499]

eigen val hamk: [0.79240471 0.79256397 0.79280687 0.79299002 0.7933006 0.79350383
0.79430298 0.79449946]

eigen val ham proj: [0.79171167 0.79215093 0.79254464 0.79285205 0.79301431 0.79364413
0.79407337 0.79452314]

eigen val hamk: [0.79241085 0.79256701 0.79271507 0.79309268 0.7932804 0.79360393
0.79387618 0.79495455]

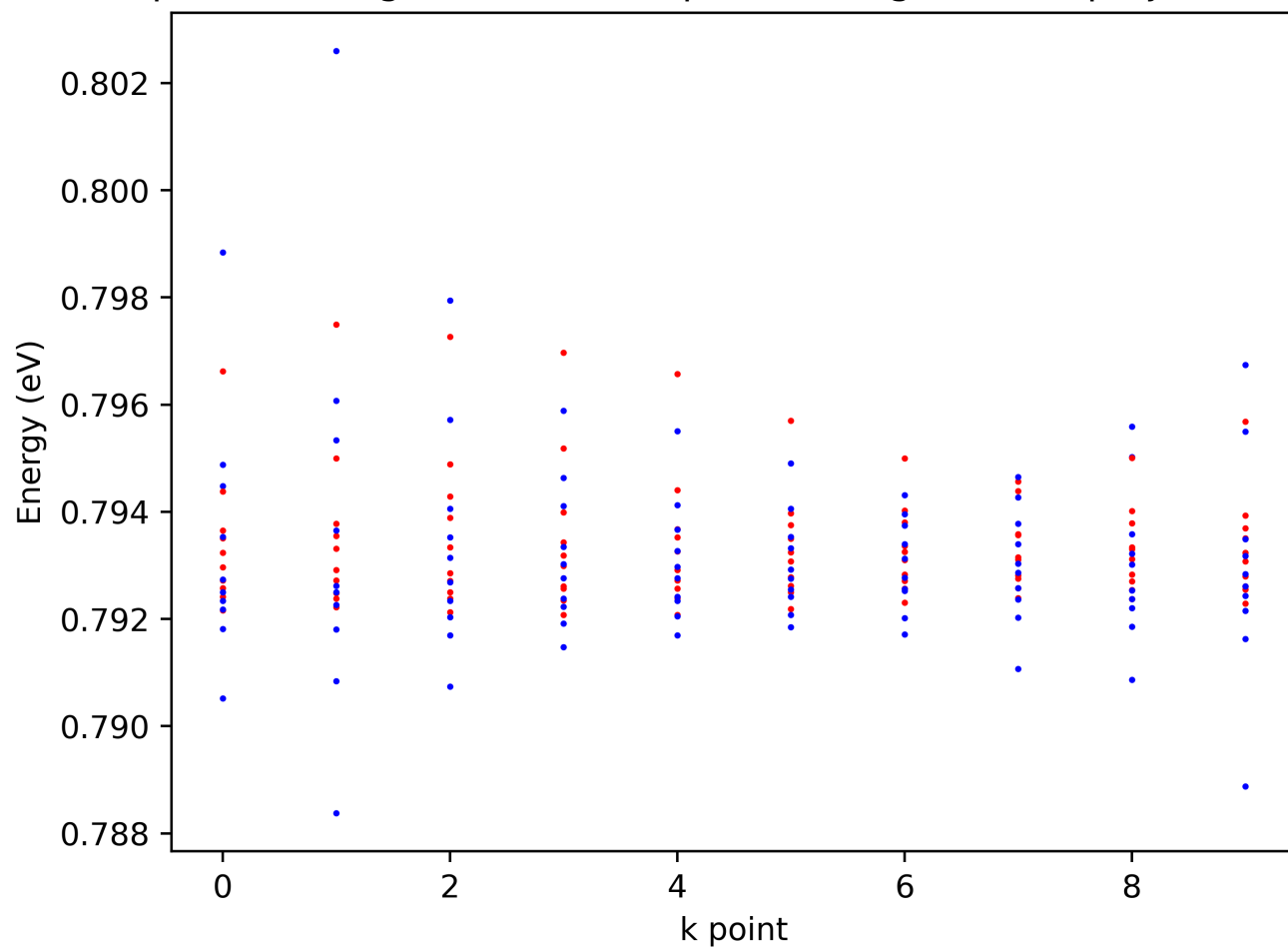
eigen val ham proj: [0.79139803 0.79207239 0.79243537 0.79255558 0.79309728 0.79330319
0.79471621 0.79504052]

eigen val hamk: [0.79228779 0.79254366 0.79269579 0.79303758 0.79340913 0.79347439
0.79377741 0.79549908]

eigen val ham proj: [0.7906106 0.79170996 0.79237485 0.79256625 0.79291206 0.79341634
0.79454258 0.79630701]

q = 5

red points for eigen value, blue point for eigen value project, valley:-1



n_moire: 30 , equals anlgle (degree) 1.0845490491577974

n_moire: 30 , equals anlgle (degree) 1.0845490491577974

dmesh loaded shape: (10, 2000, 2000)

eigen val hamk: [0.79215945 0.79241418 0.79257558 0.79272046 0.79296751 0.79323563
0.79351095 0.79365413 0.79438419 0.79662054]

eigen val ham proj: [0.79052348 0.79181535 0.79217625 0.79234258 0.79249857 0.79273734
0.7935359 0.794483 0.79488304 0.79883948]

eigen val hamk: [0.79222142 0.79238442 0.79248389 0.7927185 0.7929168 0.79331109
0.79354735 0.79377594 0.7949964 0.79749947]

eigen val ham proj: [0.78837888 0.79083941 0.7918114 0.79226078 0.79249844 0.7926157
0.79365478 0.79533586 0.79607128 0.80260036]

eigen val hamk: [0.79212602 0.79238625 0.79250197 0.79270977 0.79285392 0.79333901
0.7938885 0.79428334 0.79488891 0.79727058]

eigen val ham proj: [0.7907429 0.79169364 0.79203976 0.79234138 0.79268537 0.79314483
0.79352316 0.7940582 0.79571667 0.79794106]

eigen val hamk: [0.79207642 0.79235031 0.79256575 0.79261279 0.7929895 0.79318907
0.79343421 0.79398845 0.79518727 0.79697012]

eigen val ham proj: [0.7914734 0.79191338 0.79222631 0.79238557 0.79276228 0.79302862
0.79334526 0.79411273 0.79463468 0.79588509]

eigen val hamk: [0.79207657 0.79239533 0.79256861 0.79271852 0.79291399 0.79326545
0.79352215 0.79367601 0.79440986 0.79656946]

eigen val ham proj: [0.79169782 0.79205298 0.79233823 0.79241687 0.79276093 0.79297576
0.79327029 0.79367341 0.79412878 0.79550427]

eigen val hamk: [0.79218715 0.79250151 0.79261726 0.79278366 0.79308061 0.79324406
0.79350064 0.79375605 0.79397691 0.79569871]

eigen val ham proj: [0.79185247 0.79207607 0.79241598 0.79255423 0.79275836 0.79292882
0.79332377 0.79353285 0.7940596 0.79490548]

eigen val hamk: [0.79230597 0.79257065 0.79271644 0.79283178 0.79309977 0.79325816
0.79336536 0.79380874 0.79402806 0.79499633]

eigen val ham proj: [0.79171274 0.79201823 0.7925273 0.79256196 0.79277336 0.79313112
0.79340053 0.79374611 0.79395614 0.79431025]

eigen val hamk: [0.79239015 0.79258142 0.7927526 0.79281853 0.79311323 0.79315033
0.79356453 0.79358237 0.79438516 0.794567]

eigen val ham proj: [0.79107339 0.7920297 0.79236818 0.79257348 0.79286612 0.7930388
0.79339727 0.79377827 0.79426665 0.79465331]

eigen val hamk: [0.79237097 0.79254538 0.79270294 0.79283084 0.79311745 0.79330468
0.79334361 0.7937895 0.79401768 0.79500993]

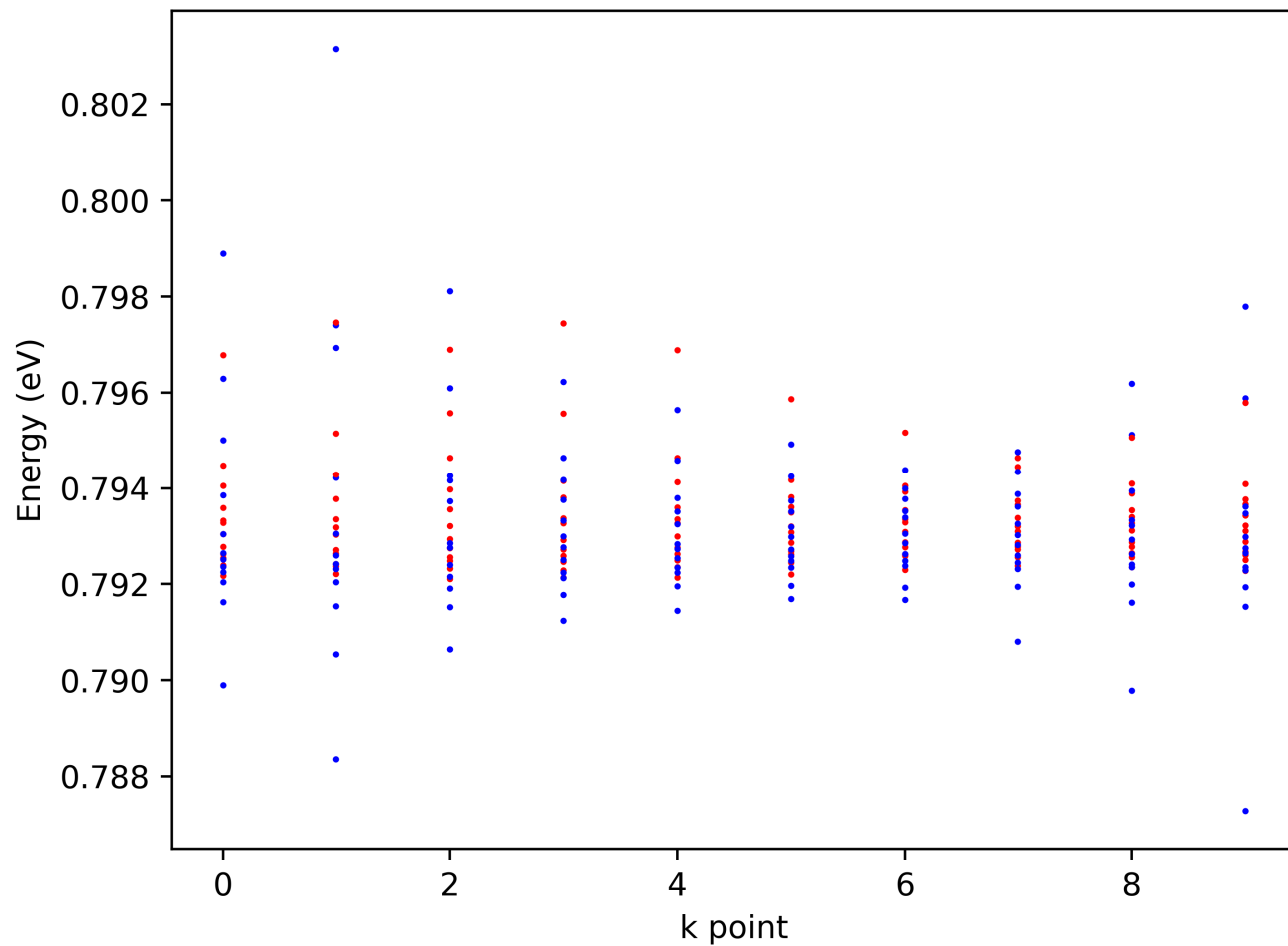
eigen val ham proj: [0.79086386 0.79185987 0.79220305 0.79237277 0.79253251 0.79301916
0.79322039 0.79358542 0.79502001 0.79558862]

eigen val hamk: [0.79228748 0.79254821 0.79261003 0.79279505 0.79308089 0.79323806
0.79350864 0.79369833 0.79393419 0.79568508]

eigen val ham proj: [0.78887943 0.79162848 0.79215692 0.79243429 0.79261248 0.79283821
0.79317958 0.79349423 0.79549597 0.79674526]

q = 6

red points for eigen value, blue point for eigen value project, valley:-1



n_moire: 30 , equals anlgle (degree) 1.0845490491577974

n_moire: 30 , equals anlgle (degree) 1.0845490491577974

dmesh loaded shape: (10, 2400, 2400)

eigen val hamk: [0.79217143 0.79239464 0.79253957 0.79262475 0.79277988 0.79303806
0.79327326 0.79332547 0.79359349 0.79405066 0.79447825 0.79678716]

eigen val ham proj: [0.78989664 0.79162893 0.79203642 0.79224573 0.79235879 0.79251121
0.79264864 0.79304588 0.79385636 0.79501053 0.79629255 0.79889917]

eigen val hamk: [0.7922088 0.79237186 0.79241841 0.79263246 0.79270869 0.79303019
0.79318533 0.79335249 0.79377962 0.79429212 0.79514856 0.79746337]

eigen val ham proj: [0.78836073 0.79053865 0.79153931 0.7920422 0.79231213 0.79241831
0.79259843 0.79304835 0.7942269 0.79692924 0.79740395 0.80314941]

eigen val hamk: [0.79210265 0.79232375 0.79248886 0.79255887 0.79274767 0.79293798
0.79321383 0.79356323 0.7939734 0.79463797 0.79557184 0.79689837]

eigen val ham proj: [0.79064654 0.79152277 0.79190358 0.79214962 0.79240016 0.79276154
0.79285037 0.79373044 0.7941634 0.7942565 0.79609728 0.79811918]

eigen val hamk: [0.79213415 0.79228984 0.79246481 0.79258678 0.79271727 0.79291732
0.79327248 0.79337383 0.79380556 0.79415491 0.79556473 0.79744783]

eigen val ham proj: [0.79124136 0.79177248 0.79212529 0.79224016 0.79250033 0.79277181
0.79299892 0.79332921 0.79375719 0.79417626 0.79463848 0.79622249]

eigen val hamk: [0.79213275 0.79234746 0.79249712 0.7926294 0.79275645 0.79299463
0.79326751 0.79335185 0.79359493 0.79413086 0.79464053 0.79688437]

eigen val ham proj: [0.79144676 0.79195753 0.7922422 0.79234167 0.79253677 0.79273117
0.79283297 0.79324684 0.79351281 0.7938015 0.79458365 0.79564275]

eigen val hamk: [0.79220565 0.79244659 0.79261553 0.79268233 0.79286127 0.79308159
0.79319906 0.79349246 0.79360627 0.79381739 0.79417761 0.7958684]

eigen val ham proj: [0.79168673 0.79196141 0.79233987 0.79248576 0.79258294 0.7927198
0.79298213 0.7931946 0.79351555 0.79374428 0.79425454 0.79492113]

eigen val hamk: [0.79229932 0.79259266 0.79261584 0.79277079 0.79287464 0.79308679
0.79328338 0.79335359 0.79354325 0.79393229 0.79405555 0.79517174]

eigen val ham proj: [0.79166988 0.79192525 0.79237988 0.79248468 0.79262955 0.79285679
0.79305375 0.79339468 0.79352562 0.7937816 0.79399302 0.79437879]

eigen val hamk: [0.79237812 0.79256263 0.79272201 0.79277287 0.79286054 0.79309535
0.79320588 0.79337879 0.79365731 0.79374337 0.79444484 0.79463941]

eigen val ham proj: [0.79079865 0.79194361 0.79231266 0.79244626 0.79259405 0.79281647
0.79302498 0.7932605 0.79362136 0.79388034 0.79434079 0.79475744]

eigen val hamk: [0.79235544 0.79255538 0.79264709 0.79277356 0.79287176 0.79311594
0.79327124 0.79340014 0.79354395 0.79388874 0.79409874 0.79506212]

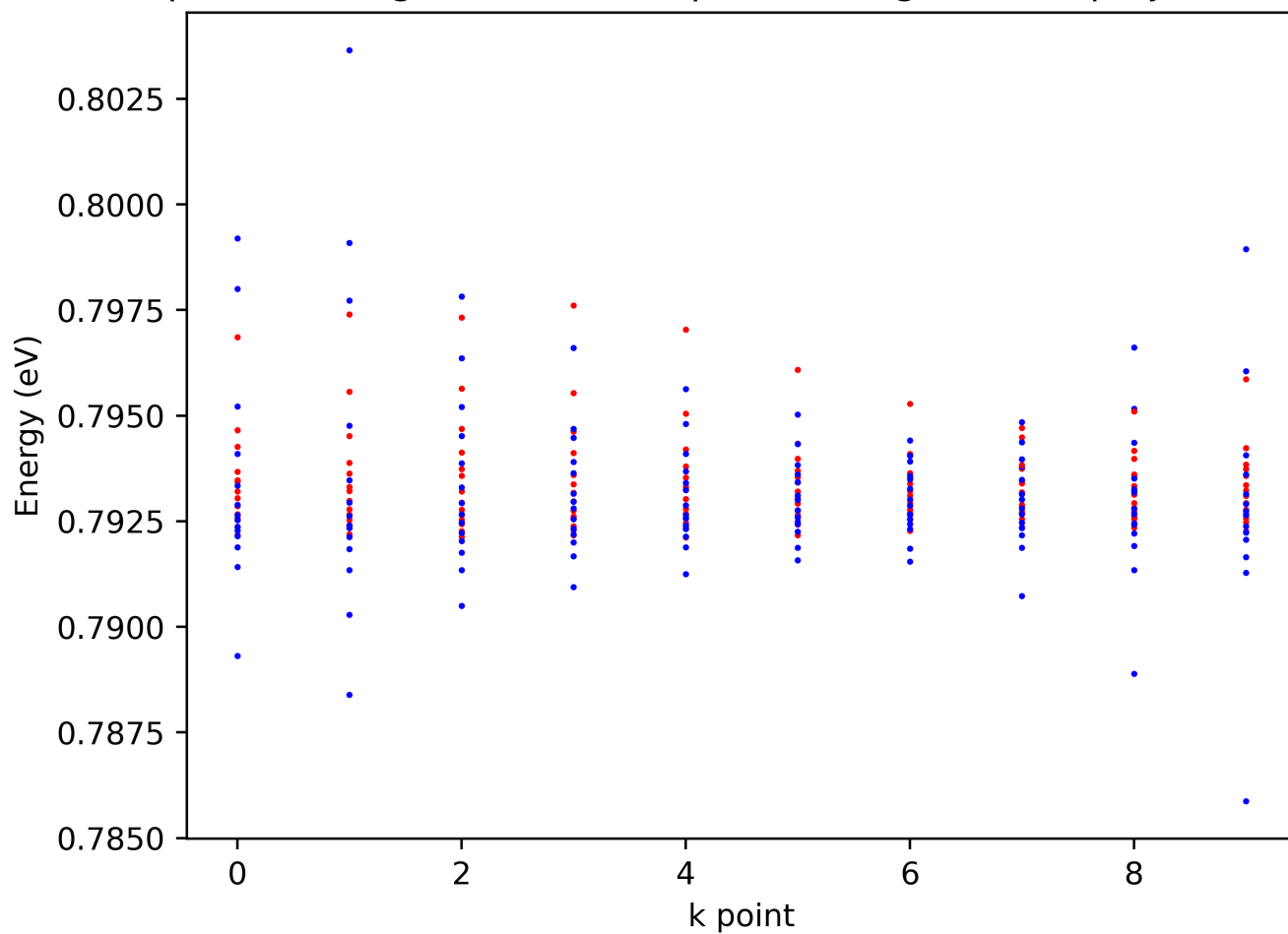
eigen val ham proj: [0.78978122 0.79161945 0.79199217 0.79234842 0.79241219 0.7926304
0.79292798 0.79322107 0.79333723 0.79395234 0.79512031 0.79618686]

eigen val hamk: [0.79227975 0.79250765 0.79260946 0.79267411 0.79288054 0.7931115
0.79321753 0.79342674 0.79366373 0.79376647 0.79408636 0.79579503]

```
eigen val ham proj: [0.78727945 0.79153029 0.79193857 0.7922875  0.79235046 0.79264736
 0.79274813 0.79298088 0.79347935 0.79361888 0.79588731 0.79779313]
```

q = 7

red points for eigen value, blue point for eigen value project, valley:-1



n_moire: 30 , equals anlgle (degree) 1.0845490491577974

n_moire: 30 , equals anlgle (degree) 1.0845490491577974

dmesh loaded shape: (10, 2800, 2800)

eigen val hamk: [0.79217722 0.79236764 0.79252526 0.79258729 0.79266813 0.79285807
0.79305061 0.79320941 0.79344466 0.7934665 0.79367396 0.79426839
0.79466083 0.79685347]

eigen val ham proj: [0.78931438 0.79142184 0.79188206 0.79215409 0.792288 0.79236978
0.7925321 0.7926483 0.79288728 0.79334428 0.79409659 0.79521487
0.79800423 0.79920002]

eigen val hamk: [0.79219271 0.79234964 0.79240045 0.79253364 0.79265883 0.79278078
0.7929888 0.79322024 0.79331303 0.79363516 0.79388284 0.79452226
0.79556488 0.79740204]

eigen val ham proj: [0.78839284 0.79029022 0.79134673 0.79184372 0.79213159 0.79234364
0.79240415 0.79262079 0.79293947 0.7934686 0.79476249 0.7977277
0.79908689 0.80365128]

eigen val hamk: [0.79212991 0.7922693 0.79243102 0.79252524 0.79264421 0.79277576
0.79294123 0.79320619 0.79357428 0.79373563 0.79412358 0.7946868
0.7956441 0.79732728]

eigen val ham proj: [0.79049556 0.79134415 0.79175531 0.79202914 0.79222633 0.79246446
0.79266586 0.79293361 0.79330407 0.79387397 0.79451588 0.7952045
0.79636302 0.7978258]

eigen val hamk: [0.792172 0.7922857 0.79238484 0.79256554 0.79260934 0.79275078
0.7929735 0.7931734 0.7933737 0.7936018 0.79411259 0.79462919
0.79553581 0.79760615]

eigen val ham proj: [0.79094565 0.79167614 0.79200218 0.79218681 0.79232432 0.79255622
0.79280632 0.79296772 0.79315748 0.79363963 0.79390297 0.79447449
0.79469028 0.79660258]

eigen val hamk: [0.7921188 0.79233967 0.79245411 0.79255928 0.79267871 0.79279542
0.79302212 0.79326992 0.79331924 0.79353706 0.7938037 0.79420263
0.79504512 0.79703996]

eigen val ham proj: [0.79124753 0.79188588 0.79213296 0.79231462 0.79240471 0.79257211
0.79264403 0.79287961 0.79324373 0.79340382 0.79368299 0.79409553
0.7948071 0.79563217]

eigen val hamk: [0.79217147 0.79242168 0.79257865 0.79264229 0.79275277 0.79291606
0.79304628 0.79321072 0.7934197 0.79354115 0.79369314 0.79397954
0.79434348 0.79608626]

eigen val ham proj: [0.79157717 0.79187194 0.79225716 0.79243668 0.79249269 0.79260348
0.79276005 0.79300966 0.79311329 0.79342745 0.79360799 0.79383254
0.79433082 0.79502876]

eigen val hamk: [0.79227387 0.79254364 0.79264236 0.79270009 0.7927773 0.79293103
0.79311663 0.79322258 0.79338767 0.79352819 0.79363828 0.79405389
0.79409314 0.7952799]

eigen val ham proj: [0.79154348 0.79185037 0.79231856 0.79243934 0.7925502 0.79267019
0.79286502 0.79301867 0.79327462 0.79348771 0.79357743 0.79391217

0.79405021 0.79441604]

eigen val hamk: [0.79236057 0.79255294 0.79268523 0.79271512 0.79285899 0.79288564
0.7931435 0.79318657 0.79339272 0.79346259 0.79374315 0.79382854
0.79448508 0.79471447]

eigen val ham proj: [0.79072689 0.79187659 0.79217432 0.79233825 0.79246507 0.79266383
0.79280536 0.79301173 0.79314097 0.79348573 0.79379307 0.79396748
0.79436634 0.79484817]

eigen val hamk: [0.79235007 0.7925581 0.79260786 0.79271995 0.79281866 0.7929268
0.79313686 0.79324513 0.79333118 0.79357919 0.79360458 0.79398248
0.79417465 0.7951019]

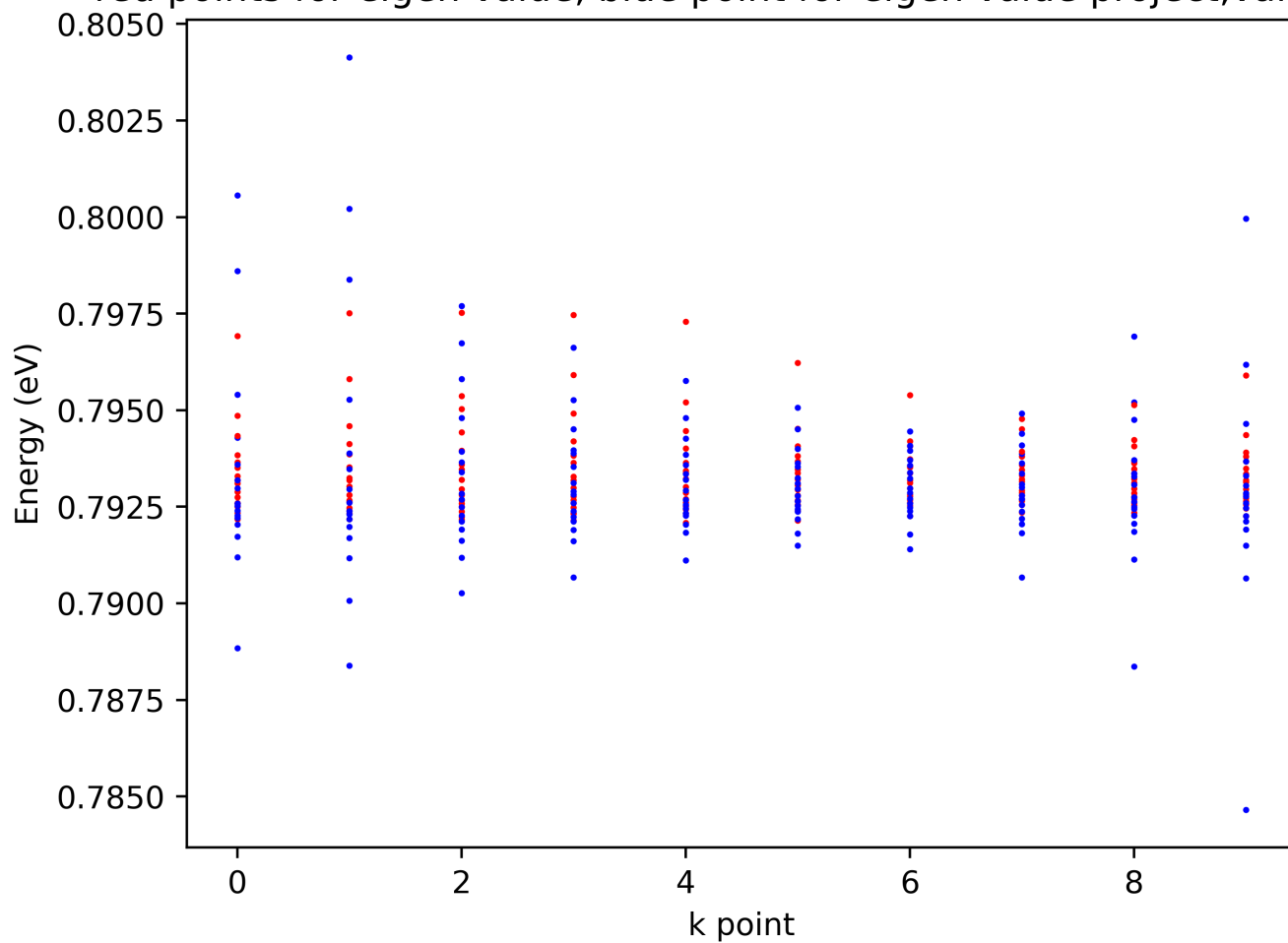
eigen val ham proj: [0.78888982 0.79134217 0.79191438 0.79221327 0.79242624 0.79245863
0.79267145 0.79279492 0.79318485 0.79326373 0.79350897 0.79436543
0.79516988 0.79661586]

eigen val hamk: [0.79226829 0.79247706 0.79257415 0.79266882 0.7927725 0.79292728
0.79310066 0.79322955 0.7933597 0.79357904 0.79374106 0.79384511
0.79423462 0.79585802]

eigen val ham proj: [0.7858738 0.79127949 0.79164853 0.79206402 0.79223099 0.79237832
0.79264618 0.79274552 0.79291357 0.79313857 0.79360608 0.7940637
0.79605574 0.79894695]

q = 8

red points for eigen value, blue point for eigen value project, valley:-1



n_moire: 30 , equals anlgle (degree) 1.0845490491577974
n_moire: 30 , equals anlgle (degree) 1.0845490491577974
dmesh loaded shape: (10, 3200, 3200)

eigen val hamk: [0.79217907 0.79234577 0.79250164 0.79258406 0.79259978 0.79274273
0.79289071 0.79310192 0.79319399 0.79329487 0.79351061 0.7936555
0.79383332 0.79434177 0.79485972 0.79692571]
eigen val ham proj: [0.78884113 0.79118849 0.79173109 0.79204536 0.79220907 0.79226899
0.7923999 0.79253034 0.79258653 0.79298241 0.79319144 0.79359644
0.79429555 0.79540585 0.79860302 0.80056498]

eigen val hamk: [0.79217816 0.79232883 0.79239446 0.79247114 0.79262672 0.7926646
0.79280782 0.79302743 0.7931906 0.7932415 0.79352503 0.79386639
0.79412929 0.79458587 0.79580977 0.79750865]
eigen val ham proj: [0.78839075 0.79007 0.79117239 0.79169054 0.79198399 0.79218092
0.79231107 0.79238933 0.79260996 0.79295362 0.79347564 0.79387945
0.79527973 0.79838058 0.80021797 0.80413399]

eigen val hamk: [0.7921653 0.7922366 0.79237395 0.79250149 0.79258234 0.79267172
0.79280906 0.7929583 0.79320422 0.79346233 0.79359269 0.79395562
0.79442962 0.79502639 0.79536529 0.79752681]
eigen val ham proj: [0.79026199 0.79118529 0.79162754 0.79191253 0.79212152 0.79227527
0.7924953 0.79269092 0.79284361 0.79339828 0.79365769 0.79392949
0.79480049 0.79580634 0.79674054 0.79769432]

eigen val hamk: [0.79214281 0.79232356 0.79234208 0.79247667 0.79259699 0.79267398
0.79276605 0.79299408 0.79318271 0.79328143 0.79364392 0.79383104
0.79419613 0.79491507 0.79591331 0.79746123]
eigen val ham proj: [0.79067122 0.79161048 0.79190065 0.7921226 0.79223342 0.79239398
0.79260114 0.79281482 0.79290182 0.79311895 0.79353996 0.79388311
0.79396256 0.79450635 0.79526663 0.79661729]

eigen val hamk: [0.79208612 0.79232618 0.79243259 0.79252012 0.79260895 0.79269661
0.79286018 0.79301899 0.79322123 0.79337077 0.79342842 0.79364181
0.79400856 0.79446408 0.7952036 0.79729736]
eigen val ham proj: [0.79111167 0.7918291 0.79204095 0.79227279 0.79232716 0.79246095
0.79254558 0.79268155 0.79291796 0.79320135 0.79334889 0.79358624
0.79384846 0.79426827 0.79480076 0.7957627]

eigen val hamk: [0.79214012 0.79239574 0.79254799 0.79264024 0.79267165 0.79279285
0.79294873 0.79306091 0.79321582 0.79337342 0.79347073 0.79367206
0.79381018 0.79407345 0.7945189 0.79622607]
eigen val ham proj: [0.79149889 0.79180463 0.79217997 0.79237101 0.79243421 0.79253074
0.79264878 0.79278044 0.79296327 0.79310512 0.79325013 0.79353639
0.79363209 0.79400347 0.79450532 0.79506258]

eigen val hamk: [0.79225673 0.79252326 0.79260846 0.79267363 0.79277338 0.79281875
0.79297504 0.79311728 0.79319281 0.79337676 0.79352502 0.79356512
0.79372919 0.79406943 0.79420162 0.79538737]
eigen val ham proj: [0.79140837 0.79178244 0.79226227 0.79239137 0.79248034 0.79259066
0.79271614 0.79286273 0.79297755 0.79323015 0.79338914 0.79357513

0.79371135 0.79395725 0.79407994 0.79444937]

eigen val hamk: [0.79234786 0.79254924 0.79265317 0.79269626 0.7927959 0.79285811
0.79292377 0.79315109 0.79321293 0.79332096 0.79345575 0.7935785
0.79380684 0.79392553 0.79451404 0.79477883]

eigen val ham proj: [0.79067299 0.79181629 0.79205658 0.79219292 0.79238078 0.79254606
0.79269702 0.79279093 0.7930072 0.79308647 0.79336808 0.79363345
0.79387705 0.79409301 0.79438945 0.79491317]

eigen val hamk: [0.79234511 0.7925403 0.79260019 0.79269905 0.79275881 0.7928533
0.79296508 0.7931188 0.79322536 0.79335913 0.79347738 0.7936322
0.79367612 0.79407155 0.7942346 0.79513375]

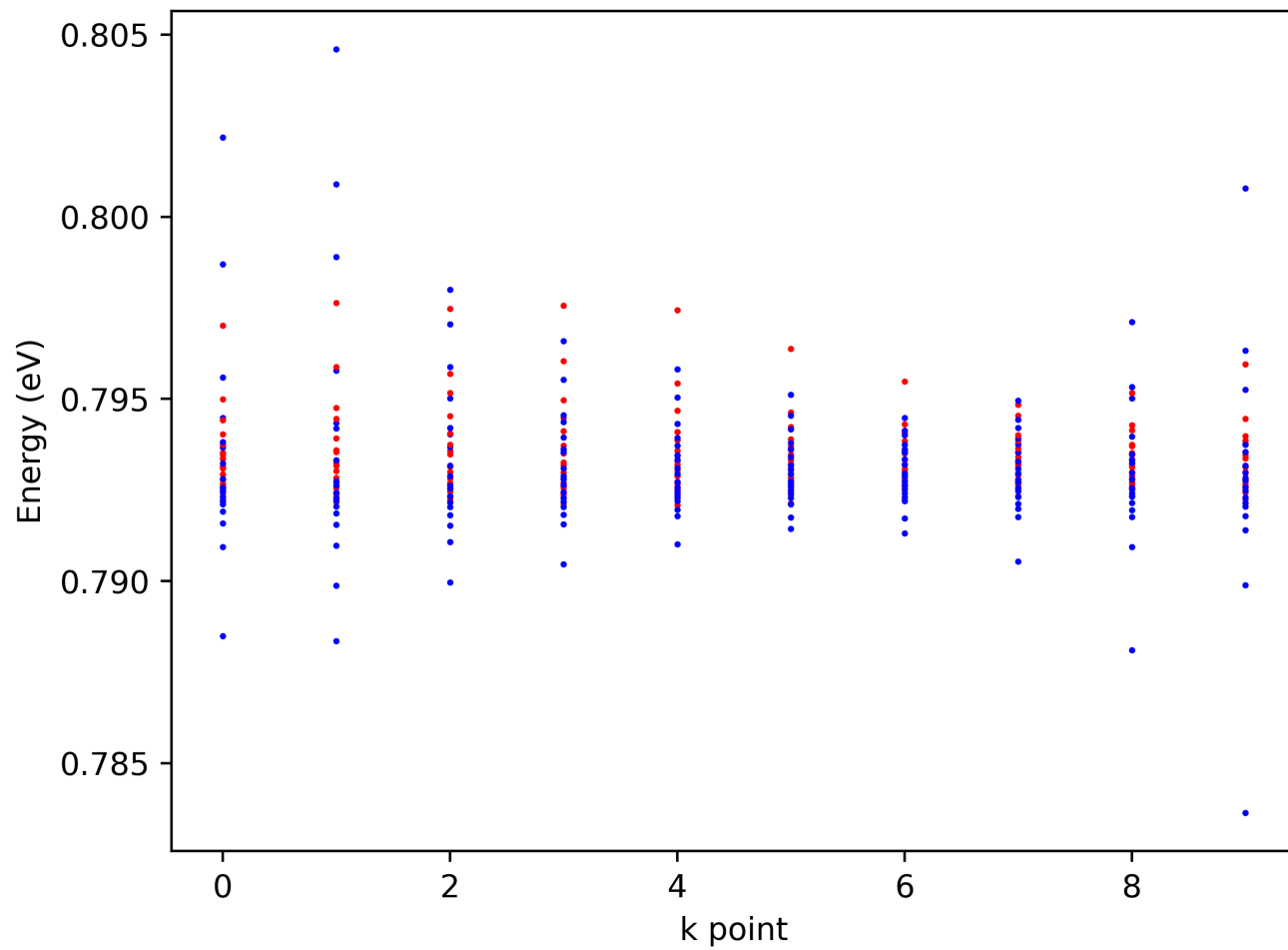
eigen val ham proj: [0.78836215 0.79113719 0.79185969 0.7920657 0.79227076 0.79245027
0.79249002 0.79263533 0.79274573 0.79307098 0.79327882 0.79336335
0.79371326 0.79475583 0.79520401 0.79691234]

eigen val hamk: [0.79225704 0.79245332 0.79256438 0.79264571 0.79272666 0.79281532
0.79295302 0.79313716 0.79319384 0.79334901 0.79349101 0.79367656
0.7938038 0.79391139 0.79436305 0.79590593]

eigen val ham proj: [0.78465459 0.79065409 0.79149116 0.79191082 0.79212013 0.79225829
0.79246637 0.79260275 0.7927752 0.79285079 0.79305068 0.79330392
0.79367929 0.79464759 0.79618543 0.79995711]

q = 9

red points for eigen value, blue point for eigen value project, valley:-1



n_moire: 30 , equals anlgle (degree) 1.0845490491577974
n_moire: 30 , equals anlgle (degree) 1.0845490491577974
dmesh loaded shape: (10, 3600, 3600)

eigen val hamk: [0.79217869 0.79232907 0.79247272 0.79255694 0.79259675 0.7926692
0.79278258 0.79293933 0.79309591 0.79314834 0.79335769 0.79345171
0.79352489 0.79374959 0.79403464 0.79442365 0.79499149 0.79701164]
eigen val ham proj: [0.78849401 0.79093431 0.79158191 0.79190816 0.79211626 0.79221183
0.79229852 0.79243265 0.79251075 0.79257565 0.79280411 0.79323073
0.79366865 0.79382403 0.79447707 0.79558976 0.79870326 0.80217844]

eigen val hamk: [0.79216985 0.79230599 0.79239216 0.79243629 0.79256387 0.79262549
0.79271204 0.79283891 0.79302361 0.79316703 0.79324158 0.79354216
0.79359873 0.79392449 0.79445271 0.79475995 0.79587228 0.7976331]
eigen val ham proj: [0.78835054 0.78987531 0.79097073 0.79155419 0.79185816 0.79204783
0.79220992 0.79227486 0.79241642 0.79261998 0.79274573 0.79332188
0.79418812 0.79434503 0.79578048 0.79889415 0.80089658 0.80459772]

eigen val hamk: [0.79217042 0.79224504 0.79232619 0.79246377 0.79253108 0.79264509
0.79269181 0.79281977 0.79299438 0.79314201 0.7934877 0.79356932
0.7937452 0.79405636 0.79452632 0.79516448 0.79569331 0.79747248]
eigen val ham proj: [0.78996283 0.79107051 0.79152868 0.7918059 0.79203241 0.79216105
0.79233907 0.7925408 0.79262133 0.79288292 0.79317574 0.7936848
0.79402879 0.79420469 0.79501976 0.7958731 0.79705163 0.79799855]

eigen val hamk: [0.79211792 0.79228997 0.79237208 0.79241618 0.79256062 0.79260993
0.79270138 0.79280648 0.79298299 0.79318828 0.79326291 0.79351156
0.79371632 0.79412485 0.79448162 0.79496765 0.79603941 0.7975585]
eigen val ham proj: [0.79046138 0.79155966 0.7918172 0.79203832 0.79218972 0.79228208
0.79244901 0.79264602 0.79279192 0.79287834 0.79309632 0.79354776
0.79362109 0.7939496 0.79436657 0.79455484 0.7955232 0.79658681]

eigen val hamk: [0.79208479 0.79228916 0.79241911 0.79250063 0.79255312 0.7926529
0.79272338 0.79288953 0.7930462 0.79319123 0.79328955 0.79343942
0.7935828 0.793869 0.79409579 0.79467921 0.79542976 0.79743943]
eigen val ham proj: [0.79101712 0.79178184 0.79196248 0.79219845 0.79229731 0.79237442
0.79247434 0.79256703 0.79272126 0.79294881 0.79310763 0.79332686
0.79345332 0.79372318 0.79392777 0.7943167 0.79504611 0.79581173]

eigen val hamk: [0.79213158 0.79237014 0.7925153 0.79261125 0.79266544 0.79271591
0.79282992 0.79296133 0.79309315 0.79320378 0.79332284 0.79347323
0.79360692 0.79368944 0.79389114 0.79422923 0.79462874 0.79637239]
eigen val ham proj: [0.79143472 0.79174461 0.79211109 0.79228703 0.79239115 0.79247728
0.79258225 0.79267176 0.79274209 0.79293892 0.79305544 0.79318073
0.7934135 0.79361636 0.79379746 0.79416497 0.79454173 0.79511083]

eigen val hamk: [0.79224742 0.79250121 0.79260292 0.79264259 0.79271241 0.79280968
0.79286538 0.79300242 0.79307938 0.79321106 0.79333793 0.79350952
0.79355006 0.793624 0.79384348 0.79408736 0.79430047 0.79547293]
eigen val ham proj: [0.79130722 0.79172413 0.79219988 0.79230744 0.79240532 0.79254036
0.79262949 0.79275117 0.79288512 0.7929541 0.79319288 0.79335002]

0.79353633 0.79360895 0.79374667 0.79400328 0.79413296 0.79447761]

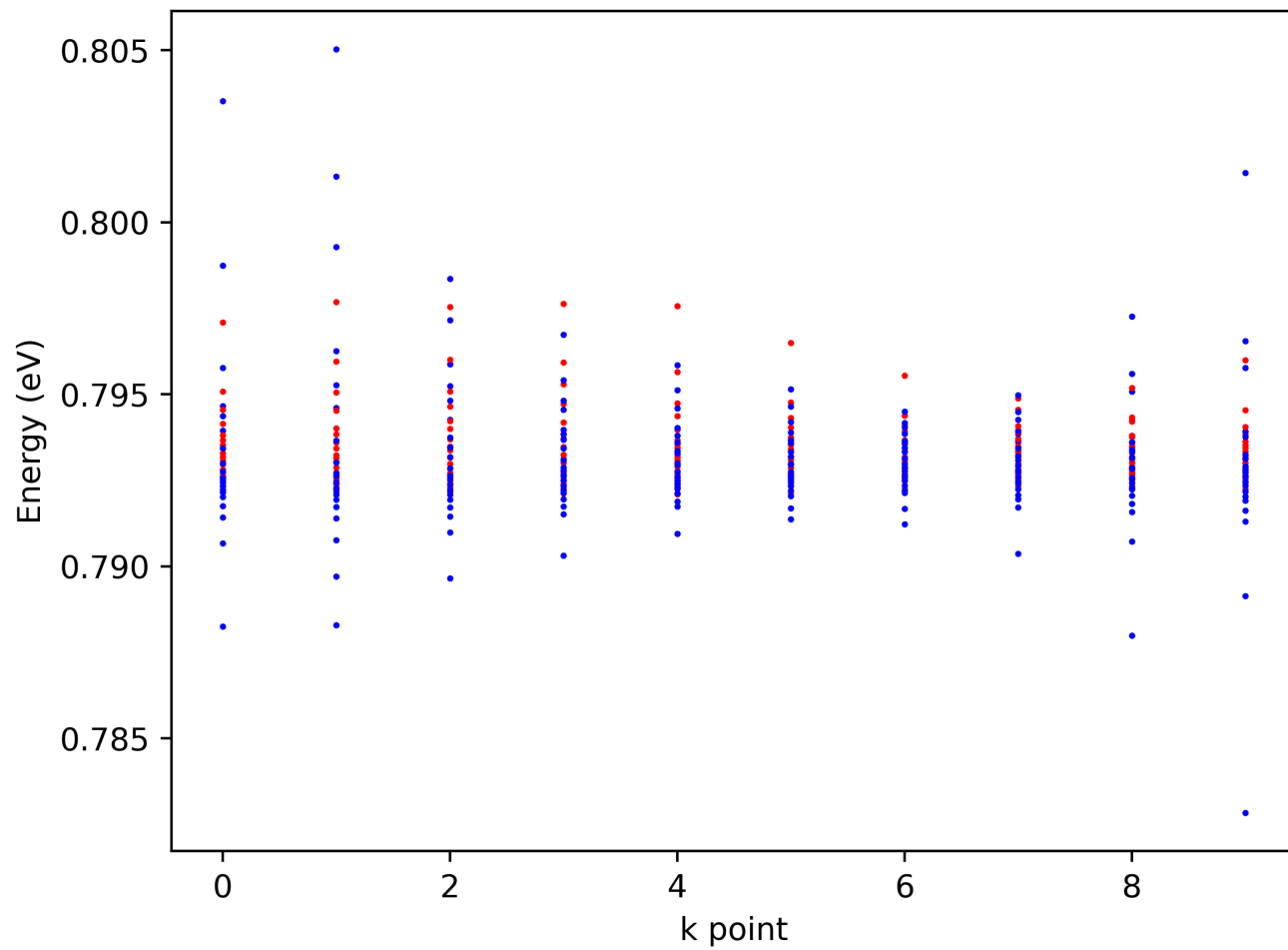
eigen val hamk: [0.79233843 0.79253932 0.79265181 0.79268352 0.79273257 0.79278603
0.79290954 0.79294549 0.79316928 0.79322032 0.79331185 0.79340474
0.7935486 0.79364062 0.79385965 0.79400472 0.79453868 0.79483673]
eigen val ham proj: [0.79054316 0.79175867 0.79198492 0.79211749 0.79231196 0.79246725
0.79256052 0.79272621 0.79278332 0.79296054 0.79307896 0.79328011
0.79352895 0.79375431 0.79391622 0.79420453 0.79442823 0.79495245]

eigen val hamk: [0.79233879 0.79252514 0.792598 0.79267762 0.79271768 0.79280625
0.79288265 0.79299564 0.79313369 0.79319738 0.79334503 0.79346727
0.7935158 0.79370468 0.79374422 0.79414828 0.79428449 0.795161]
eigen val ham proj: [0.78810527 0.79093753 0.79176454 0.79194845 0.79215302 0.79232345
0.79240344 0.79252808 0.79255591 0.79279253 0.79296703 0.79324614
0.79331531 0.79348254 0.79396546 0.79501198 0.79532927 0.79711701]

eigen val hamk: [0.79224812 0.79243642 0.79256292 0.79261019 0.79269308 0.79277678
0.79284594 0.79299544 0.79313213 0.79315747 0.79337301 0.79345813
0.79354287 0.79377547 0.79385942 0.79397815 0.7944609 0.7959504]
eigen val ham proj: [0.78363965 0.78989389 0.79139989 0.79178349 0.79204195 0.79214149
0.79229905 0.79248609 0.79258116 0.7927698 0.79281195 0.79297154
0.79316612 0.79354845 0.7937487 0.79525538 0.79632542 0.80078172]

q = 10

red points for eigen value, blue point for eigen value project, valley:-1



n_moire: 30 , equals anlgle (degree) 1.0845490491577974
n_moire: 30 , equals anlgle (degree) 1.0845490491577974
dmesh loaded shape: (10, 4000, 4000)

eigen val hamk: [0.7921771 0.79231532 0.79244725 0.79253224 0.79260027 0.79262524
0.79271444 0.7928168 0.79296867 0.79308124 0.79317517 0.79328936
0.79343497 0.7935232 0.79366588 0.79381781 0.79414528 0.79455845
0.795089 0.79709314]
eigen val ham proj: [0.78825742 0.79067096 0.79143052 0.79175946 0.79202484 0.79215316
0.79222674 0.79234536 0.79244161 0.79250109 0.79257815 0.79275844
0.79299541 0.79343365 0.79394404 0.79436905 0.79466419 0.79576575
0.79874592 0.80351997]

eigen val hamk: [0.79216757 0.79228321 0.79239022 0.79241195 0.79251225 0.79260281
0.79265519 0.79272823 0.79287108 0.79303118 0.79315277 0.79323011
0.79342732 0.7936059 0.79384369 0.7940109 0.79453003 0.79505925
0.79595317 0.79769142]
eigen val ham proj: [0.78829015 0.78970584 0.79076289 0.79139199 0.79172984 0.79193849
0.79208556 0.79222226 0.79227575 0.79243966 0.7926247 0.79270979
0.79302566 0.79365274 0.7946077 0.79526571 0.79626187 0.79928346
0.80132805 0.80502832]

eigen val hamk: [0.7921583 0.79227062 0.79229112 0.79241203 0.79251327 0.79258271
0.79265968 0.79272123 0.79284576 0.79298703 0.79316513 0.79338525
0.79348838 0.79369655 0.79400643 0.79422963 0.79464422 0.79508519
0.79600758 0.79753784]
eigen val ham proj: [0.78965596 0.79099244 0.79145036 0.79171455 0.79193872 0.79208716
0.79222228 0.79237725 0.7925349 0.79264555 0.7928511 0.79318411
0.7934632 0.79374944 0.79425856 0.79481428 0.79524492 0.79587941
0.79716234 0.79836076]

eigen val hamk: [0.79211867 0.79225376 0.792365 0.79240666 0.79248978 0.79259869
0.79264337 0.79272323 0.79282098 0.79301555 0.79313095 0.79324664
0.79346609 0.79372329 0.79385406 0.79418491 0.79472089 0.79529827
0.79593268 0.79763705]
eigen val ham proj: [0.79031116 0.79151463 0.79174475 0.79195852 0.79213491 0.79222052
0.79233751 0.7925076 0.79265692 0.79277541 0.7928833 0.79309297
0.79342973 0.79367982 0.79384083 0.79397208 0.79454809 0.79481863
0.79541299 0.79672884]

eigen val hamk: [0.7920961 0.7922654 0.79238304 0.79248506 0.79254051 0.79258931
0.79266956 0.79277137 0.79290235 0.79307166 0.79316715 0.79324639
0.79344116 0.79355605 0.79367277 0.79396906 0.79436794 0.79474327
0.79564864 0.79756008]
eigen val ham proj: [0.79094379 0.79174028 0.79189232 0.79212248 0.79226106 0.79231659
0.79240983 0.79248911 0.79259655 0.79275081 0.79295359 0.79299122
0.79328475 0.79335686 0.7936028 0.79380075 0.79403172 0.79459206
0.79512426 0.79584549]

eigen val hamk: [0.79212305 0.79235168 0.79248541 0.79259251 0.79263481 0.79269276
0.79274867 0.79286137 0.79297829 0.79310623 0.79317126 0.79334149

0.79341071 0.79354208 0.79367416 0.79374486 0.79403513 0.79431196
0.79476948 0.79649213]
eigen val ham proj: [0.79137781 0.79168997 0.79205001 0.79220406 0.79233764 0.79244258
0.79252103 0.79259232 0.79264678 0.79274935 0.79295894 0.79297933
0.79319127 0.7933225 0.7935914 0.79366976 0.79389576 0.79420438
0.79464306 0.79514681]

eigen val hamk: [0.7922372 0.79248228 0.79258899 0.7926298 0.79267997 0.79274739
0.79283604 0.79289618 0.79302175 0.79310576 0.79317858 0.79334019
0.79343874 0.79356322 0.79362546 0.79367628 0.79391853 0.79410037
0.79438932 0.79555059]
eigen val ham proj: [0.79122843 0.79167358 0.79213935 0.79220591 0.79235015 0.792502
0.79257034 0.79265008 0.79278339 0.79288227 0.79297134 0.79314128
0.79332743 0.79344118 0.79357369 0.79364344 0.79385127 0.79403774
0.79416791 0.79449936]

eigen val hamk: [0.79232995 0.79253223 0.79263661 0.79267409 0.79269822 0.7927618
0.7928275 0.7929229 0.79298212 0.79316638 0.79322816 0.79330761
0.79336981 0.79348923 0.793601 0.79371573 0.7939089 0.79407617
0.7945592 0.79488692]
eigen val ham proj: [0.79036875 0.79171065 0.79195622 0.7920751 0.79224004 0.79240887
0.79247113 0.79258841 0.79273991 0.79278757 0.79292919 0.79308664
0.79320114 0.79343059 0.79365652 0.79384963 0.79395129 0.79426839
0.79449379 0.79497366]

eigen val hamk: [0.79233246 0.79251618 0.7925895 0.79265221 0.79270584 0.79276438
0.79283775 0.79290553 0.79302428 0.79312249 0.79318142 0.79335024
0.79345195 0.79348387 0.79357907 0.79376294 0.79380825 0.79421435
0.79432801 0.79518538]
eigen val ham proj: [0.78798404 0.79072732 0.79157687 0.79182289 0.7920617 0.79224651
0.79228377 0.79242842 0.79253651 0.79257402 0.79284361 0.79287048
0.79315952 0.79331413 0.79338932 0.79361395 0.79424284 0.79508067
0.79559787 0.79725983]

eigen val hamk: [0.79224147 0.79242352 0.7925494 0.79260018 0.79265749 0.79274768
0.79279217 0.7928836 0.79301335 0.79311693 0.79317473 0.79334596
0.79343893 0.79352145 0.79362536 0.79383016 0.79391584 0.79405501
0.79454042 0.79599239]
eigen val ham proj: [0.78283939 0.78914063 0.79131167 0.79162418 0.79191714 0.79203224
0.79218376 0.7923543 0.79246951 0.79261727 0.79272709 0.79281666
0.79290559 0.79312171 0.79324363 0.79376388 0.79391833 0.79577245
0.79655457 0.80143263]